California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Floodplain Impacts Assessment and Hydrology & Hydraulics Report
Ave 17 to South of Santa Clara St

Prepared for

CALIFORNIA High-Speed Rail Authority

CALIFORNIA HIGH-SPEED TRAIN

Project Environmental Impact Report / Environmental Impact Statement

15% Final Design Submittal

Storm Water Data Report

May 2011

CALIFORNIA
High-Speed Rail Authority

U.S. Department of Transportation
Federal Railroad Administration

Dist-County-Route: 06-Fresno-99, 06-Madera-99, 10-Merced-99
Post Mile Limits: Various
Project Type: High Speed Train, Roadway Realignment
Project ID (or EA): 0600020014
Program Identification: 730.00
Phase: ☐ PID
☒ PA/ED
☐ PS&E

Regional Water Quality Control Board(s): Central Valley Region 5

Is the Project required to consider Treatment BMPs? Yes ☒ No ☐
If yes, can Treatment BMPs be incorporated into the project? Yes ☒ No ☐
If No, a Technical Data Report must be submitted to the RWQCB at least 30 days prior to the projects RTL date. List RTL Date:__________

Total Disturbed Soil Area:__________ Risk Level: 2
Estimated Construction Start Date: January 1, 2012 Construction Completion Date: January 1, 2018
Notification of Construction (NOC) Date to be submitted: December 1, 2011

Erosivity Waiver	Yes ☐	Date:__________	No ☒
Notification of ADL reuse (if Yes, provide date)	Yes ☐	Date:__________	No ☒
Separate Dewatering Permit (if yes, permit number)	Yes ☐	Permit #__________	No ☒

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Wilfred Hsu, Registered Project Engineer Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

Garth Fernandez, Project Manager, District 6 *Date*

Grace Magsayo, Project Manager, District 10 *Date*

Bill Moses, Designated Maintenance Representative, District 6 *Date*

[Stamp Required for PS&E only) *Scott Waller, Designated Maintenance Representative, District 10* *Date*

Elbert Cox, Designated Landscape Architect Representative	*Date*
Marissa Nishikawa, District/Regional Design SW Coordinator or Designee	*Date*

STORM WATER DATA INFORMATION

1. Project Description

- The California High-Speed Rail Authority (Authority), in cooperation with the Federal Railroad Administration (FRA) and California Department of Transportation (Caltrans), is proposing to construct the High-Speed Train Project (HST). The HST is an advanced, electrically powered, high-speed, steel-wheel-on-steel-rail technology that will include state-of-the-art safety, signaling, and automated train control systems. The Authority and Caltrans have entered into an agreement for oversight and coordination of services. Coordination of agency needs will enable the construction of the HST while still maintaining the operational capabilities of the State's highway network.

  The infrastructure and systems of the HST will comprise rolling stock, tracks, stations, train control, power systems, and maintenance facilities. Because the HST is a very large project to be constructed throughout the state and within multiple jurisdictions, it is broken into segments to simplify and accelerate the environmental review and design process. This SWDR is focused on the Merced to Fresno section (M-F).

  The HST within the M-F section includes three build alternatives, defined as A1 (BNSF), A2 (UPRR/SR 99), and A3 (Hybrid). Each alternative is comprised of three components: the north-south HST alignments between Merced and Fresno, a railroad wye connection with the San Jose to Merced section, and stations. In some portions of the alternatives, there are design options proposed to minimize potential environmental impacts. While each option will pose different impacts on Caltrans facilities, for the purpose of simplifying the water quality impact analysis, only the worst case will be considered here for each alternative.

  All of these build alternatives will be designed as a double-track rail system to accommodate planned project operational needs for uninterrupted rail movement. Heavy Maintenance Facility (HMF) locations are also proposed to provide storage and maintenance for the HST operations. Five HMF locations are being considered but only one will be selected. The potential HMF locations are shown in the Site Map (Merced – Fresno) attachment. A summary of the features of each alternative is presented in the table below. The project location and vicinity maps are shown in the Attachments.

Table 1 Build Alternative Summary

HST Section Inventory		A1: BNSF	A2: UPRR/SR 99	A3: Hybrid
Starting Point	Loc	Merced	Merced	Merced
End Point	Loc	Fresno	Fresno	Fresno
Rail Length	miles	68 to 80	68 to 76	70
Rail Stops	No.	2	2	2
Counties Affected	No.	3	3	3
Cities Affected	No.	4	4	3
Maintenance Facilities	No.	TBD[1]	TBD[1]	TBD[1]
Structures	No.	TBD	TBD	TBD
SHS Impact Points	No.	6 to 7	21 to 22	7

[1]Five HMF locations are being considered but only one will be selected. As shown in the Site Map (Merced – Fresno) attachment, the Castle Commerce Center potential HMF site is located outside the M-F section, just north of Merced.

The trains of the HST will be electrically powered. Most of the braking will occur via regenerative braking system that results in only minor physical brake wear. For storm water purposes, electrically powered trains in other cities have been determined to be non-polluting sources. These include the San Diego Metropolitan Transit system and the Los Angeles Metro System, as well as the light rail system serving the cities of Portland, Oregon and Seattle, Washington. Therefore the HST linear features (rail line, at-grade embankment fill, and elevated structures) are assumed to be non-pollutant-generating surfaces and runoff from these surfaces will not require storm water treatment.

Each of the build alternatives will encroach upon Caltrans right-of-way in several locations, causing impacts within Caltrans facilities in Districts 6 and 10. At this time, the details of the impacts at each facility are still being determined. The most clearly defined impact will be the realignment of approximately 2 miles of the SR-99 freeway within the City of Fresno. A summary of the encroachments and their related impacts to Caltrans facilities is presented in the table below. The actual number of encroachment locations and types of improvements will vary depending on final alignment combinations considered for the Central Valley section. The alternative alignments and design options are presented in Attachment 3A.

Table 2 Encroachments to Caltrans Facilities

No.	Location	HST Alternatives		
		A1[1]	A2[1]	A3
1	SR 59 Mainline Crossover near West 15th Street	x	x	x
2	SR 99 Mainline Crossover near 15th Street Undercrossing	x	x	x
3	SR 99/East Mission Avenue Interchange	x		
4	SR 99 Mainline Crossover near East Mission Avenue	x		
5	SR 99/Plainsburg and Arboleda Interchanges		x	x
6	SR 145 Mainline Crossover near Road 28 ½	x		x
7	SR 99 Mainline Crossover near Avenue 21	x	x	
8	SR 233 Mainline Crossover near Avenue 23 ½	x	x	x
9	SR 99 Mainline Crossover near Avenue 24	x		x
10	SB SR 99 On- and Off-Ramps near Chowchilla Boulevard		x	
11	SB SR 99 Off-Ramp		x	
12	SR 233 Mainline Crossover near SR 99/SR 233 Junction		x	
13	SB SR 99 On-Ramp		x	
14	SR 99 Mainline Crossover near SR 99/SR 152 Junction		x	
15	Avenue 21 ½/Road 20 Interchange		x	
16	SR 99/Avenue 20 and 20 ½ Interchange		x	
17	Avenue 18 ½ Interchange		x	
18	Avenue 17 Interchange		x	
19	SR 145 Mainline Crossover at 6th Street		x	
20	Avenue 13 Overcrossing		x	
21	Avenue 12 Interchange		x	
22	SR 99/Avenue 11 Overcrossing		x	
23	SR 99/Avenue 9 Interchange		x	
24	SR 99/Avenue 8 Overcrossing		x	
25	SR 99 near SR 152 Junction		x	
26	SR 99 Mainline Crossover near Avenue 20		x	
27	SR 99 Mainline Crossover near Road 19		x	
28	SR 99/SR 152 Junction		x	
29	SR 152 near Road 18		x	
30	SR 99 from Ashlan Avenue to Clinton Avenue	x	x	x

[1]*Alternative includes design options. See Impact Locations Attachments for more detail.*

Alternative A2 will incur the greatest degree of changes to Caltrans facilities. This Alternative represents the worst case scenario for water quality impacts. For the purposes of the water quality assessment, the most significant alterations of Caltrans facilities associated with this alternative are assessed in greater detail. Six impact locations will require substantial modifications to Caltrans facilities. At 24 other locations, minor modifications will be required. General project descriptions and design considerations for these impact locations are described below.

LOCATION 5: SR 99/PLAINSBURG AND ARBOLEDA INTERCHANGES: The HST A2 and Hybrid alignment alternatives are at-grade and parallel to the west of UPRR and SR 99 right-of-ways, respectively. Currently, there are at-grade intersections at SR 99 from Arboleda/Le Grand to Plainsburg/Sandy Mush. In 2012, Caltrans is planning to begin construction of the easterly realignment of SR 99 with new interchanges at Arboleda/Le Grand and Plainsburg/Sandy Mush. As part of the Caltrans projects, a frontage road will be constructed upon the existing SR 99 residual pavement resulting from the realigned highway in order to accommodate removed access from the at-grade SR 99 intersections within the Caltrans project corridor. Upon completion of the Caltrans project, the proposed HST A2 and Hybrid alternatives would effectively cut off road access to the frontage road from the west of the HST and UPRR at-grade alignments. Therefore, modifications to the highway and local road system would be necessary to accommodate HST at-grade structure. Specific improvements include the following:

- Realign Ranch Road to the south to match with future existing Le Grand Road overcrossing.
- Realign Frontage Road to the west to meet with Lingard Road on north end and S Vista Road on south end.
- Realign SB SR99 off-ramp at Le Grand Road interchange.
- Realign SB SR99 on-ramp at Le Grand Road interchange.
- Build a cul-de-sac on Le Grand Road that will no longer serve or collect traffic from SR99.
- Realign Sandy Mush Road to the north to match with future existing Sandy Mush Road overcrossing.
- Realign SB SR99 off-ramp at Sandy Much Road interchange.
- Realign SB SR99 on-ramp at Sandy Much Road interchange.

LOCATION 16: SR 99/AVENUE 20 and 20 ½ INTERCHANGE:

Alternative 1

The HST A2 alignment alternative is at-grade and parallel to the east of UPRR and SR 99 right-of-ways, respectively. The HST at-grade profile alignment crosses below Avenue 20/20 ½ which would require raising the profile of Avenue 20/20 ½ and reconstructing the SR99 and UPRR overcrossings to meet the minimum vertical clearance requirements for HST. Due to the potentially significant difference in profile grade of Avenue 20 ½ from the existing to the proposed condition, consideration was made for maintaining local access by shifting the arterial alignment and overcrossing location to the north, away from the existing condition. A new overcrossing will be required over UPRR and SR 99 as well as ramp realignments at the SR 99 interchange. Specific improvements include the following:

- Realign Avenue 20 & 20 ½ and shift the overcrossing to the north so the proposed overcrossing is at an approximate 90 degree angle to the mainline.
- Realign NB SR99 off-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign NB SR99 on-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign SB SR99 off-ramp to the west.
- Realign SB SR99 on-ramp to the west.
- Realign Golden State Blvd to the west to provide adequate distance from the SB ramps intersection.
- Reconstruct the intersection at Fairmead Blvd and Avenue 20 & 20 ½.
- Reconstruct the intersection at Road 21 and Avenue 20 & 20 ½.
- Construct a portion of Road 22 to provide access from Masa Street to existing Road 22.

Alternative 2

The HST A2 alignment alternative is at-grade and parallel to the east of UPRR and SR 99 right-of-ways, respectively. The HST at-grade profile alignment crosses below Avenue 20/20 ½ which would require raising the profile of Avenue 20/20 ½ and reconstructing the SR99 and UPRR overcrossings to meet the minimum vertical clearance requirements for HST. Due to the potentially significant difference in profile grade of Avenue 20 ½ from the existing to the proposed condition, consideration was made for maintaining local access by shifting the arterial alignment and overcrossing location to the north, away from the existing condition. A new overcrossing will be required over UPRR and SR 99 as well as ramp realignments at the SR 99 interchange. Specific improvements include the following:

- Realign Avenue 20 & 20 ½ and shift the overcrossing to the north so the proposed overcrossing is at an approximate 90 degree angle to the mainline. Connect east end of Avenue 20 & 20 ½ to Road 22.
- Construct a portion of the road to connect the proposed Avenue 20 & 20 ½ with existing Avenue 20 & 20 ½ on east end of the project.
- Realign NB SR99 off-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign NB SR99 on-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign SB SR99 off-ramp to the west.
- Realign SB SR99 on-ramp to the west.
- Realign Golden State Blvd to the west to provide adequate distance from the SB ramps intersection.
- Reconstruct the intersection at Fairmead Blvd and Avenue 20 & 20 ½.
- Reconstruct the intersection at Road 21 and Avenue 20 & 20 ½.

LOCATION 22: AVENUE 11 OVERCROSSING: The HST A2 alignment alternative is at-grade and parallel to the east of UPRR and SR 99 right-of-ways, respectively. The HST at-grade profile alignment crosses below Avenue 11 which would require raising the profile of Avenue 11 and reconstructing the SR 99/UPRR overcrossing to meet the minimum vertical clearance requirements for HST. Due to the potentially significant difference in profile grade of Avenue 11 from the existing to the proposed condition, consideration was made for maintaining local access by shifting the arterial alignment and overcrossing location to the north, away from the existing condition. A new overcrossing will be required over SR 99/UPRR as well as conforming the roadway to local roads and driveways. Specific improvements include the following:

- Realign Avenue 11 to the north.
- Construct Avenue 11 overcrossing structure.
- Realign Golden State Blvd to the west.
- Reconstruct driveway to provide access to private properties.

LOCATION 23: AVENUE 9 INTERCHANGE: The HST A2 alignment alternative is at-grade and parallel to the east of UPRR and SR 99 right-of-ways, respectively. The HST at-grade profile alignment crosses below Avenue 9 which would require raising the profile of Avenue 9 and constructing new overcrossings over SR 99 and UPRR to meet the minimum vertical clearance requirements for HST. Due to the potentially significant difference in profile grade of Avenue 9 from the existing to the proposed condition, consideration was made for maintaining local access by shifting the arterial

alignment and overcrossing location to the south, away from the existing condition. New overcrossings will be required over UPRR and SR 99 as well as ramp realignments at the SR 99 interchange. Specific improvements include the following:

- Realign Avenue 9 to the south.
- Construct Avenue 9 overcrossing at SR99 from 2 lanes to 2 lanes with a dedicated left-turn lane for access to the NB SR99 on-ramp.
- Realign NB SR99 off-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign NB SR99 on-ramp slightly to the east from one to two-lane ramp immediately beyond gore area.
- Realign SB SR99 off-ramp to the west.
- Realign SB SR99 on-ramp to the west.
- Realign Road 30 ½ to the east.
- Realign Road 31 ½ to the south to intersect with the proposed Golden State Blvd at approximately 1,000 feet south of the intersection of the Avenue 9 and Road 31.
- Construct Golden State Blvd to intersect with the proposed Road 31 ½.
- Reconstruct driveway to provide access to private properties.

<u>LOCATION 24: AVENUE 8 OVERCROSSING</u>: The HST A2 alignment alternative is at-grade and parallel to the east of UPRR and SR 99 right-of-ways, respectively. The HST at-grade profile alignment crosses below Avenue 8 which would require raising the profile of Avenue 8 and reconstructing the SR 99/UPRR overcrossing to meet the minimum vertical clearance requirements for HST. Due to the potentially significant difference in profile grade of Avenue 8 from the existing to the proposed condition, consideration was made for maintaining local access by shifting the arterial alignment and overcrossing location to the south, away from the existing condition. A new overcrossing will be required over SR 99/UPRR as well as conforming the roadway to local roads and driveways. Specific improvements include the following:

- Realign Avenue 8 to the south.
- Construct Avenue 8 overcrossing structure.
- Reconstruct the intersection at Road 32 and Avenue 8.
- Reconstruct the intersection at local road and Avenue 8.

<u>LOCATION 30: SR 99 FROM ASHLAN AVENUE TO CLINTON AVENUE:</u> The A1, A2, and Hybrid alignment for HST is on an elevated structure that parallels Golden State

Boulevard north of Ashlan Avenue then runs along the west side of the UPRR rail yard over Clinton Avenue. The existing SR 99 mainline facility between Clinton Avenue and Ashlan Avenue is a north-south 6-lane highway adjacent to the west side of the UPRR rail yard with southbound on- and off-ramps at Shields Avenue, on-ramp at Dakota Avenue and Princeton Avenue. In order to facilitate the proposed HST alignment, SR 99 would be realigned and shifted approximately 80 feet to the west between Clinton Avenue and Ashlan Avenue. The proposed SR 99 mainline would maintain six mixed flow through lanes with the addition of one auxiliary lane in each direction between Clinton Avenue and Ashlan Avenue. The SR 99 Interchange at Clinton Avenue would be modified and the Clinton Avenue Bridge overcrossings at SR 99 and UPRR would be replaced to accommodate the HST aerial structure alignment and facilitate its construction. The northbound off-ramp and southbound on-ramp at Ashlan Avenue Interchange would be reconstructed at the conform point to SR 99.

The majority of the project-related water quality impacts result from these six locations because the scale of the modifications to these facilities and the construction sites are large.

OTHER IMPACT LOCATIONS:

The other 24 locations that encroach on Caltrans right-of-way have less roadway impact and mostly involve crossing the proposed HST viaduct over Caltrans facilities. These impact locations do not require local roadway modifications. The HST viaducts are a one-to-two track structure, ranging from 30-to-50-ft wide, and supported by five-to-ten-foot diameter concrete columns. In most cases, the columns completely span Caltrans facilities. At Locations 2, 4, 6, 7, 9, 15, and 29, the columns are proposed either in the median or in the gap opening between structures. At Location 10, the concrete columns are proposed on existing SB SR99 on-and off-ramps. Location 8 is the only encroachment where the HST is proposed as an at-grade structure. While the column footprints are minimal, a complete assessment of storm water impacts will be performed at a later time.

Some locations (Locations 4, 6, 7, 9, 12, 13, 14, 18, 20, 25, and 29) will require concrete barriers or metal beam guard rails constructed on Caltrans roadway to protect traffic from the HST columns. It is assumed that there will be no change in impervious surface area due to the construction of concrete barriers or metal beam guard rails and therefore no water quality impacts are anticipated.

Additionally, four locations (Locations 6, 8, 10, and 26) will require the reconstruction or realignment of Caltrans facilities to accommodate the HST structure crossing. It is assumed that the reconstruction/realignment will be part of separate Caltrans projects to be completed before the HST and should not be considered part of the HST project impacts.

- The total disturbed area has been calculated for all of the impact locations that require substantial modifications to Caltrans facilities and is presented in the table below.

Table 3 Disturbed Soil Areas

Location	Disturbed Soil Area (acres)
SR 99/Plainsburg and Arboleda Interchanges	23.9
SR 99/Avenue 20 and 20 ½ Interchange	33.8
SR 99/Avenue 11 Overcrossing	1.7
SR 99/Avenue 9 Interchange	31.4
SR 99/Avenue 8 Overcrossing	1.7
SR 99 from Ashlan Avenue to Clinton Avenue	60.6
Total DSA	153.1

- Impervious surface areas have been quantified for all of the direct impact locations. The existing and post-project paved areas are presented in the table below.

Table 4 Impervious Areas

Location	Existing Paved Area (acres)	Post-Project Paved Area (acres)
SR 99/Plainsburg and Arboleda Interchanges	5.5	5.5
SR 99/Avenue 20 and 20 ½ Interchange	3.8	5.9
SR 99/Avenue 11 Overcrossing	0.2	0.2
SR 99/Avenue 9 Interchange	4.9	5.8
SR 99/Avenue 8 Overcrossing	0.2	0.2
SR 99 from Ashlan Avenue to Clinton Avenue	45.7	46.1
Total impervious surface areas	60.3	63.7

The post-project paved area for the SR 99 realignment from Ashland Avenue to Clinton Avenue assumes that the existing SR 99 mainline facility will be unpaved in the post-project condition.

- The project lies within several Municipal Separate Storm Sewer Systems (MS4s) in Fresno, Madera, and Merced County.

2. Site Data and Storm Water Quality Design Issues (refer to Checklists SW-1, SW-2, and SW-3)

- The project is located within five Hydrologic Sub Areas (HSAs): 535.70, 535.80, 545.20, 545.30, and 551.30, as presented in the table below.

Table 5 Hydrologic Sub Areas

HSA	Sub-Area	Area	Unit
535.70	Undefined	El Nido-Stevinson	San Joaquin Valley Floor
535.80	Undefined	Merced	San Joaquin Valley Floor
545.20	Undefined	Madera	San Joaquin Valley Floor
545.30	Undefined	Berenda Creek	San Joaquin Valley Floor
551.30	Undefined	Fresno	San Joaquin Valley Floor

The HST would result in numerous water body crossings. Watersheds for the major streams crossed by the project generally extend into the Sierra Nevada foothills and/or mountains. The streams flow northeast to southwest or east to west toward the San Joaquin River, which drains the Central Valley south of Sacramento. There are 19 natural, named water bodies along the downstream UPRR/SR 99 alignment, listed from north to south, as shown in the Site Map (Merced – Fresno) attachment:

- Canal Creek
- Black Rascal Creek
- Bear Creek
- Miles Creek Overflow No. 1
- Miles Creek
- Owens Creek
- Duck Slough
- Mariposa Creek
- Deadman Creek
- Dutchman Creek
- Chowchilla River
- Ash Slough
- Berenda Slough
- Berenda Creek
- Dry Creek
- Schmidt Creek
- Fresno River
- Cottonwood Creek
- San Joaquin River

Only two water bodies in the study area—Bear Creek and the San Joaquin River—are listed as impaired on the U.S. Environmental Protection Agency's 303(d) list (USEPA, 2007). Bear Creek has a total maximum daily load (TMDL) for mercury, completed in 2007. The San Joaquin River (Friant Dam to Medota Pool) is impaired for exotic species. However neither of these are identified as a Targeted Design Constituent for Caltrans.

- Clean Water Act 401 Certification is required for any project that may result in a discharge into the waters of the state to ensure that the proposed project will not violate state water quality standards. The project will require Regional Water Quality Control Board (RWQCB) 401 certification.
- There are no drinking water reservoirs within the project limits. There are existing regional infiltration basins within the project study area owned and operated by Fresno Metropolitan Flood Control District (FMFCD).
- The Caltrans PPDG requires that beneficial uses, effluent limits, and any TMDLs be identified for each of the receiving water bodies for runoff from the project site. The Bear Creek Mercury TMDL became effective in 2007. Beneficial uses have been established in the Central Valley Region and listed in the table below.

Table 6 Beneficial Uses

Surface Water Body	Beneficial Use[1]
Chowchilla River (Buchanan Dam to San Joaquin River	Municipal and Domestic Supply (potential); Agricultural Irrigation; Industrial Process; Water Contact Recreation; Canoeing and Rafting (potential); Non-contact Water Recreation; Warm Freshwater Habitat; Wildlife Habitat
Fresno River (Hidden Reservoir to San Joaquin River)	Municipal and Domestic Supply (potential); Agricultural Irrigation; Agricultural Stock Watering; Water Contact Recreation; Canoeing and Rafting (potential); Non-contact Water Recreation; Warm Freshwater Habitat; Wildlife Habitat
San Joaquin River (Friant Dam to Mendota Pool)	Municipal and Domestic Supply; Agricultural Irrigation; Agricultural Stock Watering; Industrial Process; Water Contact Recreation; Canoeing and Rafting (potential)Non-contact Water Recreation; Warm/Cold Freshwater Habitat; Warm/Cold Migration; Spawning; Wildlife Habitat

[1]Beneficial use is existing unless noted as "potential"

Source: Water Quality Control Plan (Basin Plan), Central Valley Region, 2009, Central Valley RWQCB

- The BMPs proposed for this project meet or exceed local MS4 permit requirements. The BMPs proposed for the project are also approved for consideration by local agencies. No other local agency requirements and concerns regarding water quality are anticipated.
- **Climate.** The climate in the middle San Joaquin Valley is semi-arid with dry summers of extended hot weather and cool winter temperatures with fog and light to intermediate rain. The average annual precipitation in the study area is approximately 11 inches, with the majority of precipitation occurring from October through April (Western Regional Climate Center [WRCC], 2009). The rainy season has been defined as the period from October 1 to May 1. Average temperature and precipitation data are provided in the table below for the cities of Merced, Madera, and Fresno.

Table 7 Temperature and Precipitation

City of Merced (Station No. 045532; 1899-2009)													
Temperature (F)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Average Max	55.0	61.6	67.2	74.4	82.6	90.8	97.1	95.4	90.0	79.8	66.2	55.6	76.3
Average Min	36.0	38.7	41.2	44.8	50.6	56.4	60.9	58.9	54.7	47.1	39.5	35.6	47.0
Precipitation (Inches)													
Average	2.46	2.16	1.95	1.08	0.44	0.09	0.02	0.02	0.15	0.58	1.38	1.87	12.20
City of Madera (Station No. 045233; 1928-2009)													
Temperature (F)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Average Max	53.9	61.2	67.3	74.9	84.0	91.8	98.3	96.5	90.9	80.5	66.1	55.1	76.7
Average Min	35.8	39.1	41.7	45.5	51.3	56.7	61.4	59.7	55.1	47.6	39.7	35.7	47.4
Precipitation (Inches)													
Average	2.00	1.93	1.78	1.07	0.40	0.10	0.01	0.02	0.14	0.58	1.18	1.74	10.96
City of Fresno (Station No. 043257; 1948-2009)													
Temperature (F)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Annual**
Average Max	54.5	61.5	67.0	74.5	83.6	91.7	98.2	96.3	90.5	79.7	65.3	54.6	76.5
Average Min	37.5	40.6	43.8	47.9	54.4	60.4	65.6	63.9	59.4	51.0	42.4	37.2	50.3
Precipitation (Inches)													
Average	2.11	1.90	1.87	1.01	0.37	0.14	0.01	0.01	0.16	0.51	1.14	1.58	10.80

Source: Western Regional Climate Center (WRCC), 2009

Soils. Representative boring logs were collected within and adjacent to the project alternatives and HMFs. Information in these borings logs indicates that subsurface soils generally consist of layered loose or soft to very dense or hard clay, silt, and sand of varying contents. Thicknesses and depths of loose/soft soils, medium dense/stiff soils, and dense/hard soils vary throughout the study area.

Topography. Elevations across the project alternatives and HMFs range between 170 feet North American Vertical Datum of 1988 (NAVD 88) at the northern end to about 292 feet NAVD 88 at the southern end, with a high point of 305 feet NAVD 88 near Highway City. There is a general downward gradient in the study area to the west-southwest determined principally by the gentle slope of the vast alluvial fans

extending from the Sierra Nevada in the east to the axis of the San Joaquin Valley to the west. However, since the project is located on the San Joaquin Valley floor, slopes near the project site are flat with littile topographic relief.

Geology. The geology of the areas of the proposed HST alternatives and HMFs is variable within the project limits, despite the relative flat topography. This variability is the result of the various deposition processes that resulted in the thick accumulation or marine and continental sediments. Surficial geologic units underlying the project alternatives and HMFs consist primarily of alluvial deposits of clay, silt, sand, and gravel with varying grain sizes and content. The soil type and consistency of these deposits vary from location to location, and even within each unit, depending on how they were deposited. The geologic formations present are the Post-Modesto, Modesto, Riverbank, Turlock Lake, North Merced Gravel, Laguna, Mehrten, Great Valley, and Pleistocene nonmarine formations. Bedrock is encountered about 6 miles below ground surface (bgs).

Groundwater. Groundwater levels in the San Joaquin Valley Groundwater Basin fluctuate with seasonal rainfall, withdrawal, and recharge. Recharge occurs naturally as precipitation infiltrates and/or artificially with imported or reclaimed water. Though few portions of the San Joaquin Valley have high infiltration capacity because of limitations to infiltration created by clay or hardpan layers in the surface soils or subsurface materials, recharge areas do exist along active stream channels that contain substantial amounts of sands and gravels in their stream corridors.

General depths to groundwater were determined from groundwater contour maps from various years (1982, 1990, 2000, and 2002). Depth to groundwater varies from 0 to 190 feet in the study area. The groundwater information for different years also indicates that the depth to groundwater can vary considerably (about 20 feet or more) each season, depending on rainfall conditions.

Groundwater is typically shallower toward the northern and southern ends of the UPRR/SR 99 and BNSF Alternative alignments and is deepest between the cities of Chowchilla and Madera. Groundwater is also generally deeper toward the northeast part of the study area and becomes shallower toward the southwest part.

Right-of-Way. Major urban centers along the project alignment are Merced at the north end and Fresno at the south end, where passenger stations are planned. Madera is a moderate-sized suburban city along the central portion of the alignments. Smaller towns include Chowchilla and Le Grand, while minor communities include Fairmead, Berenda, Sharon and Kismet. Land use upstream of the project and between the cities is rural agriculture or undeveloped.

Right-of-way acquisition needs are anticipated to be significant due to the direct impacts associated with construction of HST within Caltrans right of way, and associated freeway/interchange realignments.

- Soil groups within the project area have been mapped and classified according to criteria determined by the U.S. Department of Agriculture Natural Resources Conservation Service. Based on these criteria, soils are classified into four hydrological soil groups: A, B, C, and D. Type A soils have relatively high infiltration rates and low

runoff potential, e.g., sand and gravel, and Type D soils have very low infiltration rates and high runoff potential, e.g., clay soils or soils with a shallow water table. All four soil types are present within the study area. The soils in the southern portion of the study area, south of the San Joaquin River, are largely Type D with some Type C soils. Type D soils also predominate in the central portion of the study area, but Class B soils are common. In the northern portion of the study area, Type B and C soils are common. Small bands of Type A soils can be found in the central and southern portions of the study area.

- It is not anticipated that this project would reuse soil that contains aerially deposited lead.
- The project does not require any additional right-of-way acquisition for implementing storm water BMPs. All treatment BMPs will be constructed within the Caltrans right-of-way. Specific right-of-way needs and acquisition costs are dependent on the alternative alignment, degree of impacts to Caltrans facilities, and existing land use. Detailed ROW acquisition costs will be identified during the design phase.
- The project will be designed to avoid or reduce stormwater impacts wherever feasible. Slope disturbance and cut-and-fill slopes will be minimized. Alternative materials for facilities will be utilized wherever feasible to reduce future maintenance impacts on water quality. Project construction schedules will be phased to minimize construction during the rainy season as much as possible. Ease of maintenance will be considered as well.

Dry weather flows generated by Caltrans are not anticipated to be persistent within the project limits.

- A preliminary review of as-builts indicates that there are no existing treatment BMPs within the project limits.

3. Regional Water Quality Control Board Agreements

- The project site lies within the jurisdiction of RWQCB Region 5 (Central Valley). The project shall conform to Caltrans National Pollutant Discharge Elimination System (NPDES) statewide storm permit (Order No. 99-06-DWQ, NPDES Permit No. CAS000003) and Construction General Permit (Order No. 2009-0009-DWQ, NPDES General Permit No. CAS000002). There are currently no agreements between Caltrans and Region 5 that are specific to the project area.

4. Proposed Design Pollution Prevention BMPs to be used on the Project.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

- The project site is adjacent and drains to several receiving waters that ultimately flow to San Joaquin River. The storm water runoff from the project site would increase flow velocities marginally. Potential increased erosion from higher runoff flows would be minimized using erosion control measures such as rock slope protection. Any adverse impacts to the downstream channel conditions and sediment loading potential are

anticipated to be minor. Total increased pavement areas for direct impact locations are shown in the table below. There is a net increase of 3.4 acres of paved area.

Table 8 Increased Paved Areas

Location	Increased Paved Area (acres)
SR 99/Plainsburg and Arboleda Interchanges	0.0
SR 99/Avenue 20 and 20 ½ Interchange	2.1
SR 99/Avenue 11 Overcrossing	0.0
SR 99/Avenue 9 Interchange	0.9
SR 99/Avenue 8 Overcrossing	0.0
SR 99 from Ashlan Avenue to Clinton Avenue	0.4
Total	3.4

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

- Implementation of the project would require the creation of new cut-and-fill slopes. These new slopes would be 4:1 (horizontal to vertical) or flatter wherever possible, except where steeper slopes are required due to site constraints. Slope surface protection for the new cut-and-fill slopes would be provided using either vegetative or hard-surface methods. In the existing project area, there is currently no protection provided by hard-surface methods; and much of the existing areas are protected only by vegetative methods. The proposed permanent erosion control strategy will be to use vegetative cover to protect new slopes of 2:1 or flatter. Upon completion of the project, all new and modified slopes would be sprayed with a Landscape Architect approved erosion-control mix. Rock slope protection (RSP) may be included to protect the fill slopes near existing tributary creek beds. Concrete slopes may be proposed at bridge abutment locations.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

- Where the cut slopes are steeper than 4:1 or where sheet flow from the roadway is not possible or must be avoided, asphalt concrete dikes, toe of fill ditches, and downdrains/overside drains will be used to control runoff and minimize gullies and scour.
- Where cross-culverts convey onsite and offsite runoff under the highway, flared end sections will be specified at the inlet/outlet of the culverts; and RSP will be provided at the culvert outlets to minimize scour and erosion at cross-culvert transitions.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

- The project will require removal of existing non-irrigated vegetation. Where feasible, existing vegetation will be preserved. Where disturbances are unavoidable, the disturbed vegetation will be replaced in-kind with an Erosion Control seed mix approved by the District Landscape Architect.
- No areas have been identified as off-limits to the Contractor.
- Disturbed areas will be minimized to the maximum extent possible. Critical areas such as floodplains, wetlands, problem soils, steep slopes, and environmentally sensitive areas will be delineated in the plans.

Design Pollution Prevention BMP Cost Estimate

- Design Pollution Prevention (DPP) BMP costs for each encroachment into Caltrans ROW are not available at this time. However the cost for DPP BMPs in the SR99 realignment between Ashlan Avenue and Clinton Avenue are possible since this portion of the project has been developed in greater detail. For this portion of the project, the costs for DPP BMPs is estimated to be $23,040. The cost summary is presented in the attachment.

5. Proposed Permanent Treatment BMPs to be used on the Project

Treatment BMP Strategy, Checklist T-1

- A project must consider treatment for a Targeted Design Constituent (TDC) when an affected water body within the project limits is on the 303(d) list for one or more of these constituents. For this project, mercury and exotic species are the only constituents identified listed on the 303(d) list. Neither of these constituents is identified as a TDC. Therefore, this project will follow Matrix A for general purpose pollutant removal.
- The RWQCB does not have an established sizing criterion for determining the water quality depth in the project area. Instead, a water quality depth of 0.58 inch has been determined using Basin Sizer (Caltrans method) for volume-based Treatment BMPs. This value is based on a 48-hour drawdown time and a runoff coefficient of 1.0. The Water Quality Flow (WQF) has been negotiated between the SWRCB and each of the local RWQCBs, and should be used as the basis for designing the flow-based Treatment BMPs. For the project, Region 5 (Central Valley) has established a runoff rate for the WQF of 0.16 inch/hr.

  Upon the completion of the project, the total paved area for the SR-99 realignment in Fresno between Ashlan Ave and Clinton Ave is estimated to be 46.1 acres, including 0.4 acres of new paved area. For this project a total of 35.18 ac of paved area is proposed to be treated. The attached Treatment BMPs summary tables show the areas treated by the biofiltration swales and infiltration basins. If all proposed BMPs are implemented, approximately 76% of the runoff from paved areas will be treated in

the SR 99 realignment portion of the project. This represents approximately 8,795% of the new paved area within this portion of the project.

The total water quality volume (WQV) for the project is not determined yet since the details of the impacts to Caltrans ROW have not been determined completely for each alternative.

- The Treatment BMP strategy is to consider the existing site constraints and determine the feasibility of BMP implementation at the site-specific location. The goal is for the BMPs to treat as much of the paved area runoff to the maximum extent practicable (MEP). Treatment BMPs have been evaluated individually for implementation on the proposed project in accordance with the guidelines provided in the PPDG (Caltrans, 2010). The strategy is to first evaluate Low impact Development (LID) type BMPs such as biofiltration strips/swales, infiltration devices and other earthen-type BMPs. According to the PPDG, infiltration devices are always a first choice to be considered when selecting a Treatment BMP for a Caltrans project. Therefore, the priority for treatment will be infiltration devices followed by other earthen-type BMPs.

  For the SR-99 Realignment in Fresno, infiltration basins and biofiltration swales are the primary treatment BMPs proposed. A BMP and Drainage Concept Plan is presented in the Attachments which shows that some of the biofiltration swales will provide pretreatment prior to discharging to infiltration basins. An alternative concept for the SR-99 realignment project would include infiltration trenches at the downstream of several biofiltration swales.

  For the other project encroachments into Caltrans facilities, the impacts are associated with proposed overcrossing and interchange improvements, which are in various stages of preliminary design. While BMP and Drainage Concept Plans are not completed for these other portions of the project, it is anticipated that a similar BMP strategy may be used to provide treatment for a similar fraction of the total water quality volume.

  It should be noted that some project encroachments may be located in areas outside of an urban MS4 which may not be directly or indirectly discharging to surface waters. For these areas, Treatment BMPs may not be required if approved by the District/Regional Storm Water Coordinator.

Biofiltration Swales/Strips, Checklist T-1, Parts 1 and 2

- Biofiltration swales are feasible Treatment BMPs that have been incorporated into the project. Coordination with the District Landscape Architect will be required to determine which seed mix is preferred for this project. At this stage, there are 18 biofiltration swales proposed for the project in the SR 99 realignment portion of the project between Ashlan Avenue and Clinton Avenue.
- The paved tributary area for the biofiltration swales is 29.7 ac. The total tributary area including unpaved surfaces is 46.2 ac. A summary table of the proposed biofiltration swales is provided below and in the attachment.

Table 9 Biofiltration Swales

Biofiltration Swale	Paved Tributary Area (ac)	Total Tributary Area (ac)	Total WQF
29L	0.85	1.34	0.16
37L	0.83	1.38	0.16
39L	2.18	3.33	0.39
47L	0.55	0.96	0.11
51L	1.17	1.98	0.23
53L	0.56	1.06	0.12
59L	2.09	3.10	0.37
62R	2.36	3.15	0.40
70R	2.10	3.09	0.37
73L	1.94	3.09	0.36
81L	1.87	2.96	0.35
82R	1.87	2.96	0.35
95L	1.43	2.27	0.27
96R	1.43	2.27	0.27
104R	1.90	3.02	0.35
105L	1.90	3.02	0.35
118R	1.90	2.93	0.35
121L	2.76	4.32	0.51
Total	29.68	46.20	5.46

Dry Weather Diversion, Checklist T-1, Parts 1 and 3

- Dry weather diversions are not appropriate for this project because dry weather flows generated by Caltrans are not anticipated to be persistent.

Infiltration Devices – Checklist T-1, Parts 1 and 4

- Two alternative BMP Concepts are proposed for Treatment BMPs in the SR 99 realignment portion of the project. The first alternative includes infiltration basins and biofiltration swales as the primary Treatment BMP selections. The second alternative adds infiltration trenches at the downstream end of some biofiltration swales. The biofiltration swales would provide pretreatment to capture sediment in the runoff, which is required for infiltration trenches.

  Infiltration devices will be incorporated into the project if the soils and groundwater elevations make it feasible. While the predominant soil group in the study area is

Type D soil, which is inappropriate for infiltration, there are also areas of Type A, B, and C soils. The preliminary soil classification will need to be confirmed by field testing prior to construction. Also, the local groundwater table will need to be established to determine the appropriateness of infiltration devices. Two infiltration basins are proposed within the SR-99 realignment area. The total WQV treated by these infiltration basins is 31,216 cf.

At this point, all proposed volume-based BMPs have been identified as infiltration basins. This is because infiltration basins are the preferred Treatment BMP for the project and provide the highest level of stormwater treatment of all the volume based BMPs. Should field testing rule out infiltration, then biofiltration swales will become stand alone BMPs, with no downstream trench.

- The approximate tributary area for these infiltration basins is summarized below and in the Attachments:

Table 10 Infiltration Basins

Infiltration Basin	Paved Tributary Area (ac)	Total Tributary Area (ac)	Total WQV
37L	4.20	9.18	12,464
133L	7.93	12.21	18,752
Total	12.13	21.39	31,216

- The soil types, HSG, and permeability of the existing soils at each infiltration device location will be collected during the design phase to determine the feasibility of implementing the proposed BMPs. Should infiltration basins be determined to be infeasible, detention devices or media filters may be substituted at a later time.
- Groundwater elevations, infiltration rates, and geotechnical integrity at specific BMP sites will be determined during the design phase. The BMP concept assumes that infiltration devices are feasible for the PA/ED phase.

Detention Devices, Checklist T-1, Parts 1 and 5

- Detention devices should be considered for implementation wherever infiltration basins are not feasible. The determination will be made after the field testing to conclude whether the soil properties and groundwater table are appropriate for infiltration.

Gross Solids Removal Devices (GSRDs), Checklist T-1, Parts 1 and 6

- Gross Solids Removal Devices (GSRDs) are not appropriate for this project because downstream receiving waters are not listed on the 303(d) list for litter/trash and a trash TMDL has not been developed.

Traction Sand Traps, Checklist T-1, Parts 1 and 7

- The project is not located where sand or other traction enhancing substances are applied to the roadway at least twice per year. Therefore, Traction Sand Traps are not proposed.

Media Filters, Checklist T-1, Parts 1 and 8

- Earthen-based Austin sand filters should be considered for implementation wherever infiltration basins are not feasible. The determination will be made after the field testing to conclude whether the soil properties and groundwater table are appropriate for infiltration.

Multi-Chambered Treatment Trains (MCTTs), Checklist T-1, Parts 1 and 9

- The project site does not contain a critical pollutant source area, such as vehicle service facilities, parking areas, paved storage areas and fueling stations. Therefore, MCTTs are not feasible and not recommended for implementation on this project.

Wet Basins, Checklist T-1, Parts 1 and 10

- The project site does not have a permanent source of water to maintain a pool and the groundwater is too far below the surface to be considered as a source of water. Therefore, a wet basin is not feasible and is not proposed to be incorporated on this project.

Permanent Treatment BMP Cost Estimate

- Permanent Treatment BMP costs for each encroachment into Caltrans ROW are not available at this time. However the cost for Treatment BMPs in the SR99 realignment between Ashlan Avenue and Clinton Avenue are possible since this portion of the project has been developed in greater detail. For this portion of the project, the costs for Treatment BMPs is estimated to be $1,034,446 to $3,043,040, depending on the BMPs chosen. The cost summary is presented in the attachment.

6. Proposed Temporary Construction Site BMPs to be used on Project

- The following Construction Site BMPs may be implemented and included as separate Bid Line Items:
    - Project Scheduling
    - Temporary Hydraulic Mulch (Bonded Fiber Matrix)
    - Temporary Concrete Washout Bin
    - Temporary Check Dams
    - Temporary Fiber Rolls
    - Temporary Construction Entrance
    - Temporary Drainage Inlet Protection

- The following Construction Site BMPs may be implemented and incorporated as a lump sum. It is anticipated that the project may employ:
    - Water Pollution Control
        - SWPPP Preparation
        - Construction Site Monitoring Program
        - Sampling and Analysis Plan
        - Rain Event Action Plan
        - Implementation and Reporting Requirements
    - Construction Site Management
        - Spill Prevention and Control
        - Material Management
        - Material Storage
        - Stockpile Management
        - Waste Management
        - Non-Storm Water Management
    - Street Sweeping
- This project is identified as Risk Level 2. Monitoring locations will be identified at a later stage.
- Dewatering will be required to remove accumulated precipitation during storm events, or may be during excavations for construction of abutment wall or elevated track foundations, etc. At this point, no separate dewatering permit is anticipated to be required. Any dewatering will follow the provisions stated in SSP S5-630.
- Active treatment systems (ATS) are not anticipated to be used for the project site.
- This preliminary SWDR submittal is intended to serve as the initial coordination effort to get concurrence with Construction regarding the Construction Site BMP strategy and associated quantities. Further coordination will take place as needed.
- An estimate of quantities and costs for Construction Site BMPs will be developed as a part of the Storm Water BMP Cost Summary. This preliminary cost will be calculated by assuming a percentage of the total estimated construction cost. The PPDG prescribes a 1.25 percent estimate for projects with a construction cost greater than $12,000,000.

  A preliminary estimate of the capital construction cost range is $160 to $180 million. Based on the assumption that Construction Site BMPs will be 1.25 percent of the total construction cost, it is estimated that the Construction Site BMPs will cost between $2.0 to $2.3 million.

7. Maintenance BMPs (Drain Inlet Stenciling)

Drain inlet stenciling is not required for this project because pedestrian traffic is not expected to occur on the State Highway, even though the project site is located within several MS4s.

Required Attachments

- Vicinity Map
- Evaluation Documentation Form (EDF)
- Risk Level Determination Documentation

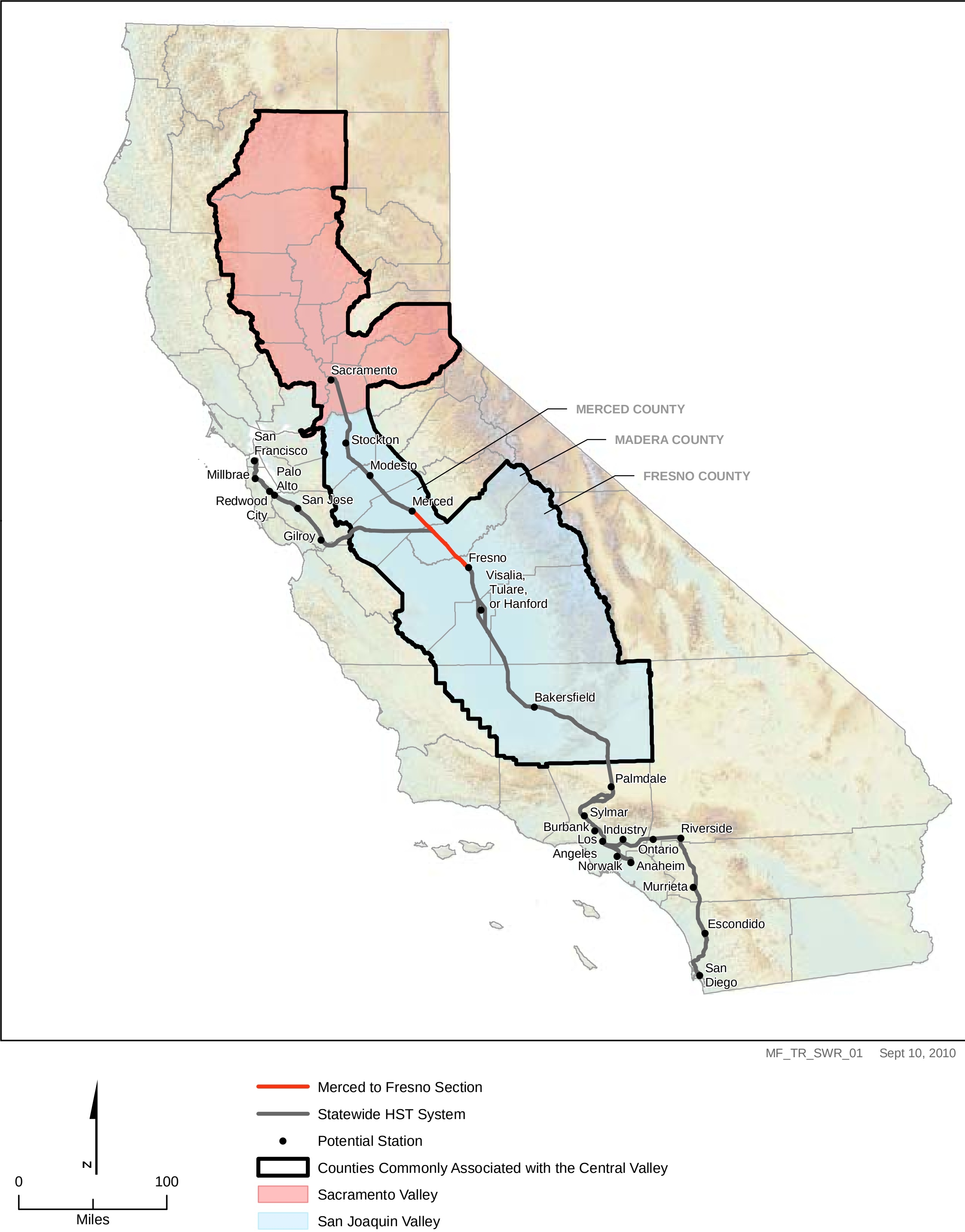
Supplemental Attachments

Note: Supplement Attachments are to be supplied during the SWDR approval process; where noted, some of these items may only be required on a project-specific basis.

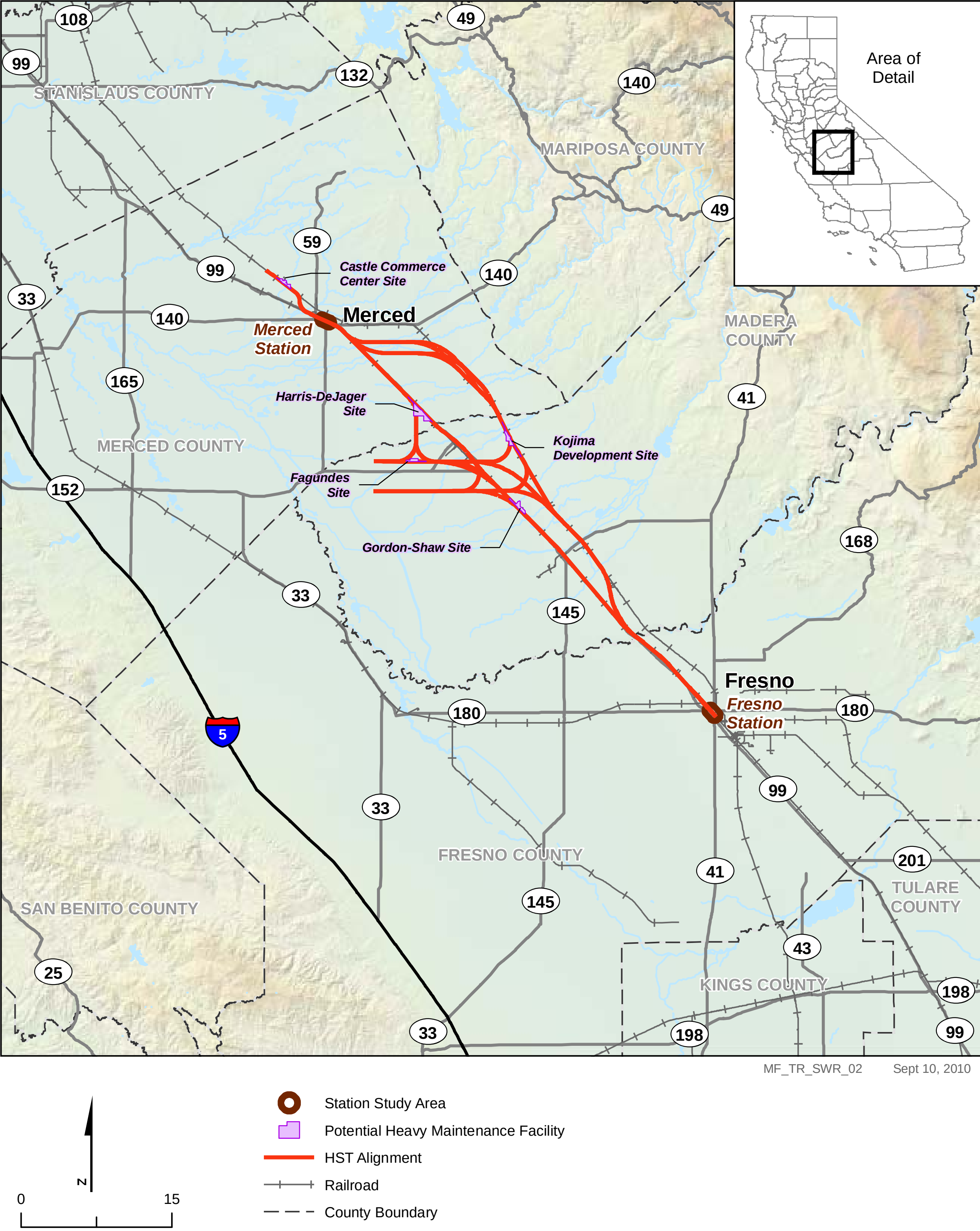
- Storm Water BMP Cost Summary
- BMP cost information from Project Planning Cost Estimate (PPCE)
- Conceptual BMP and Drainage Plans
- Checklist SW-1, Site Data Sources
- Checklist SW-2, Storm Water Quality Issues Summary
- Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water BMPs
- Checklists DPP-1, Parts 1–5 (Design Pollution Prevention BMPs) [only those parts that are applicable]
- Checklists T-1, Parts 1–10 (Treatment BMPs) [only those Parts that are applicable]
- Impact Locations
- Treatment BMP Summary Spreadsheet

REQUIRED ATTACHMENTS

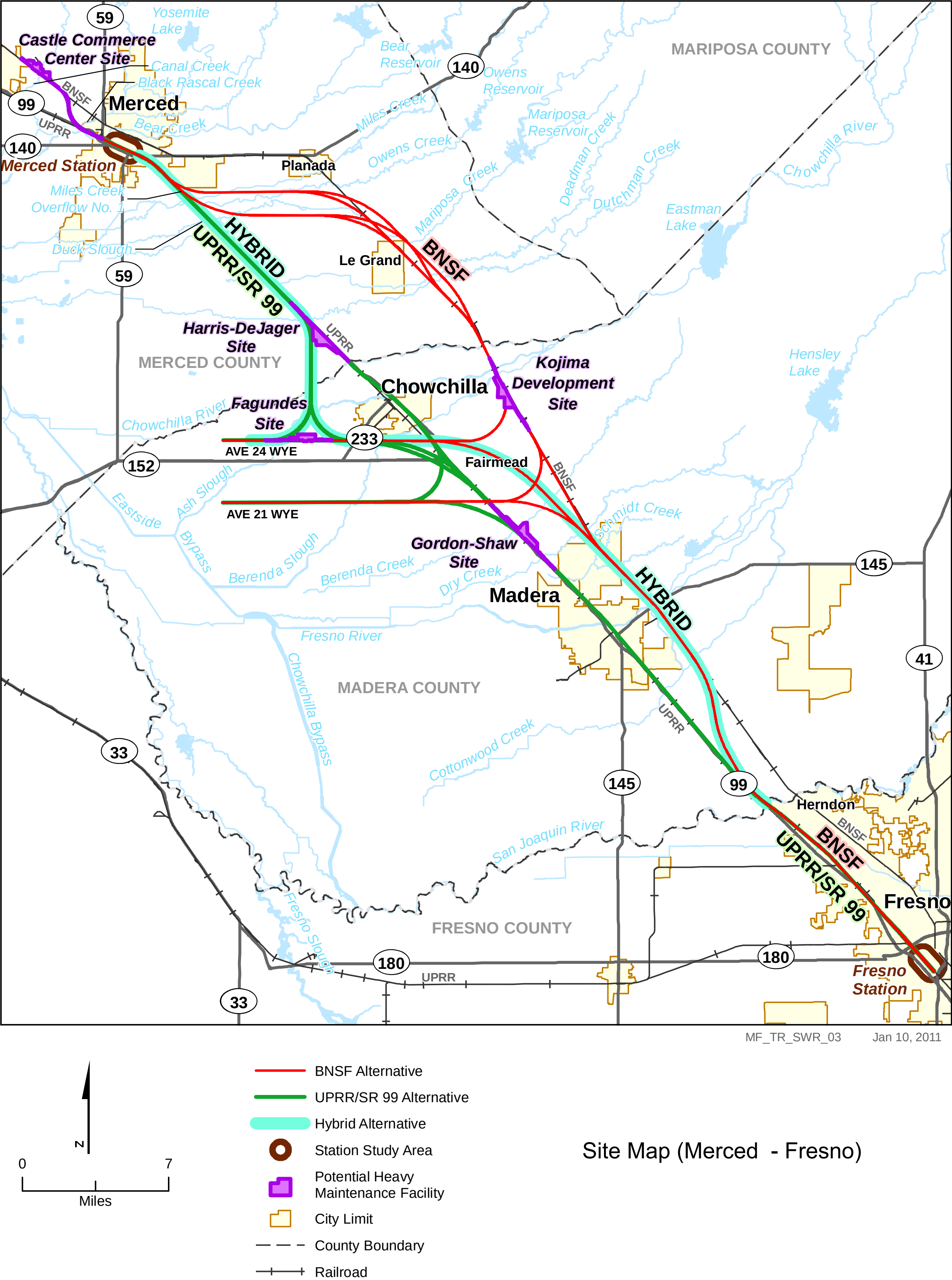
PROJECT LOCATION MAPS



Vicinity Map (HST)



Vicinity Map (Merced - Fresno)



Site Map (Merced - Fresno)

EVALUATION DOCUMENTATION FORM

DATE: ___January 14, 2011__

Project ID (or EA): ____0600020014______

NO.	CRITERIA	YES ✓	NO ✓	SUPPLEMENTAL INFORMATION FOR EVALUATION
1.	Begin Project Evaluation regarding requirement for consideration of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs. Go to 2.
2.	Is this an emergency project?		✓	If **Yes**, go to 10. If **No**, continue to 3.
3.	Have TMDLs or other Pollution Control Requirements been established for surface waters within the project limits? Information provided in the water quality assessment or equivalent document.	✓		If **Yes**, contact the District/Regional NPDES Coordinator to discuss the Department's obligations under the TMDL (if Applicable) or Pollution Control Requirements, go to 9 or 4. _______ *(Dist./Reg. SW Coordinator initials)* If **No**, continue to 4.
4.	Is the project located within an area of a local MS4 Permittee?	✓		If **Yes**, *(write the MS4 Area here)*, go to 5. If **No**, document in SWDR go to 5.
5.	Is the project directly or indirectly discharging to surface waters?	✓		If **Yes**, continue to 6. If **No**, go to 10.
6.	Is it a new facility or major reconstruction?	✓		If **Yes**, continue to 8. If **No**, go to 7.
7.	Will there be a change in line/grade or hydraulic capacity?			If **Yes**, continue to 8. If **No**, go to 10.
8.	Does the project result in a net increase of one acre or more of new impervious surface?	✓		If **Yes**, continue to 9. If **No**, go to 10. *3.4 (Net Increase New Impervious Surface)*
9.	Project is required to consider approved Treatment BMPs.	✓	See Sections 2.4 and either Section 5.5or 6.5 for BMP Evaluation and Selection Process. Complete Checklist T-1 in this Appendix E.	
10.	Project is not required to consider Treatment BMPs. _______*(Dist./Reg. Design SW Coord. Initials)* _______*(Project Engineer Initials)* _____________ *(Date)*		Document for Project Files by completing this form, and attaching it to the SWDR.	

See Figure 4-1, Project Evaluation Process for Consideration of Permanent Treatment BMPs

RISK LEVEL DETERMINATION DOCUMENTATION

Combined Risk Level Matrix

<table>
<tr><td></td><td></td><td colspan="3">Sediment Risk</td></tr>
<tr><td></td><td></td><td>Low</td><td>Medium</td><td>High</td></tr>
<tr><td rowspan="2">Receiving Water Risk</td><td>Low</td><td>Level 1</td><td colspan="2">Level 2</td></tr>
<tr><td>High</td><td colspan="2">Level 2</td><td>Level 3</td></tr>
</table>

Project Sediment Risk:	**Low**
Project RW Risk:	**High**
Project Combined Risk:	**Level 2**

Receiving Water (RW) Risk Factor Worksheet	**Entry**	**Score**
A. Watershed Characteristics	**yes/no**	
A.1. Does the disturbed area discharge (either directly or indirectly) to a **303(d)-listed waterbody impaired by sediment**? For help with impaired waterbodies please check the attached worksheet or visit the link below: 2006 Approved Sediment-impared WBs Worksheet http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2006_epa.shtml **OR** A.2. Does the disturbed area discharge to a waterbody with designated beneficial uses of SPAWN & COLD & MIGRATORY? http://www.ice.ucdavis.edu/geowbs/asp/wbquse.asp	**yes**	**High**

	A	B	C
1	**Sediment Risk Factor Worksheet**		**Entry**
2	**A) R Factor**		
3	Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.		
4	http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm		
5	**R Factor Value**		72
6	**B) K Factor (weighted average, by area, for all site soils)**		
7	The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.		
8	Site-specific K factor guidance		
9	**K Factor Value**		0.32
10	**C) LS Factor (weighted average, by area, for all slopes)**		
11	The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.		
12	LS Table		
13	**LS Factor Value**		0.33
14			
15	**Watershed Erosion Estimate (=RxKxLS) in tons/acre**	7.6	
16	**Site Sediment Risk Factor**	**Low**	
17	Low Sediment Risk: < 15 tons/acre		
18	Medium Sediment Risk: >=15 and <75 tons/acre		
19	High Sediment Risk: >= 75 tons/acre		
20			

U.S. ENVIRONMENTAL PROTECTION AGENCY

National Pollutant Discharge Elimination System (NPDES)

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Stormwater Home

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National Pollutant Discharge Elimination System Home

Rainfall Erosivity Factor Calculator for Small Construction Sites

Facility Information

Facility Name: HST - Fresno to Merced
Start Date: 01/01/2012
End Date: 01/01/2018
Latitude: 37.0547
Longitutde: -120.1711

Erosivity Index Calculator Results

AN EROSIVITY INDEX VALUE OF 72 HAS BEEN DETERMINED FOR THE CONSTRUCTION PERIOD OF **01/01/2012 - 01/01/2018**.

A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do not qualify for a waiver from NPDES permitting requirements**.

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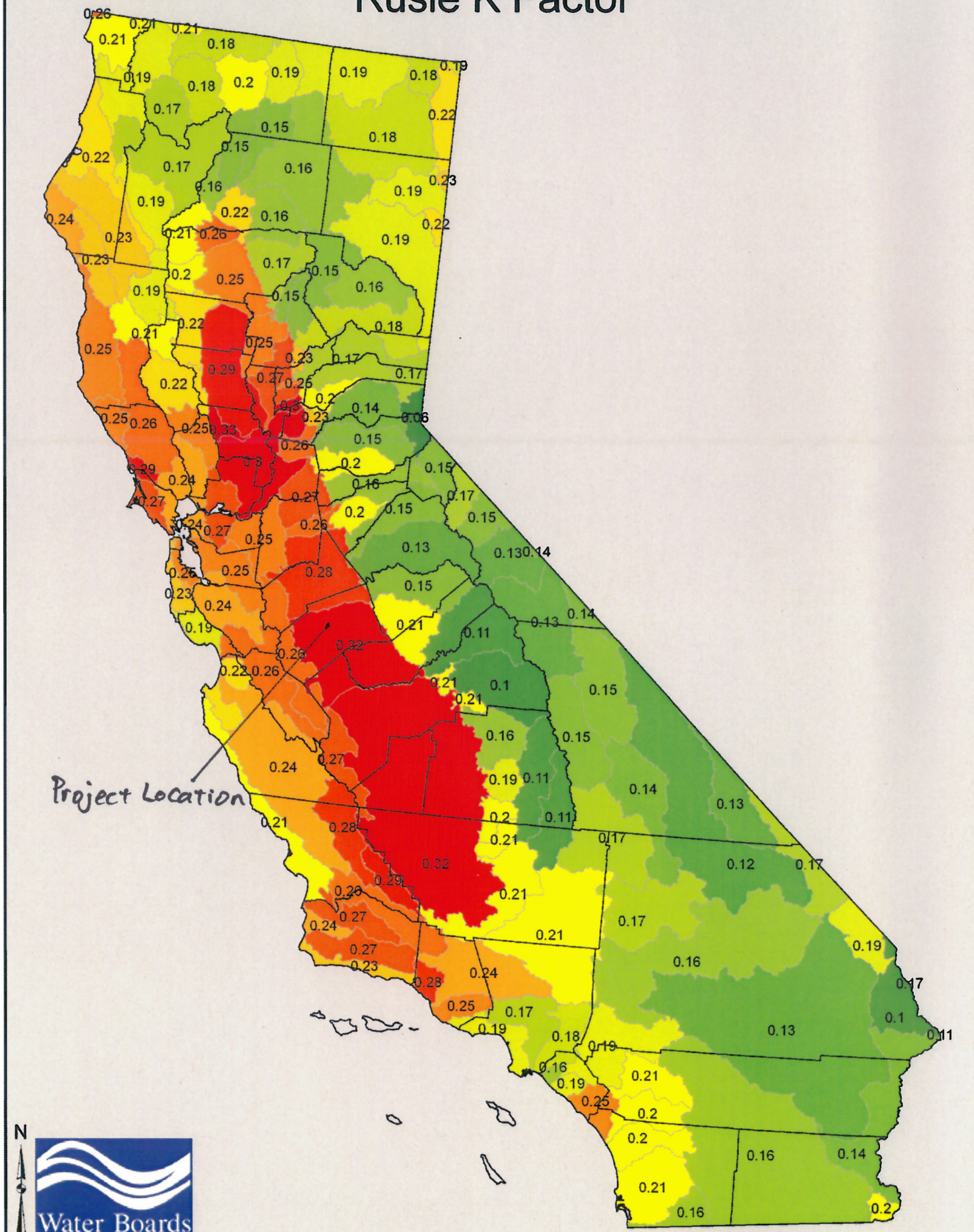
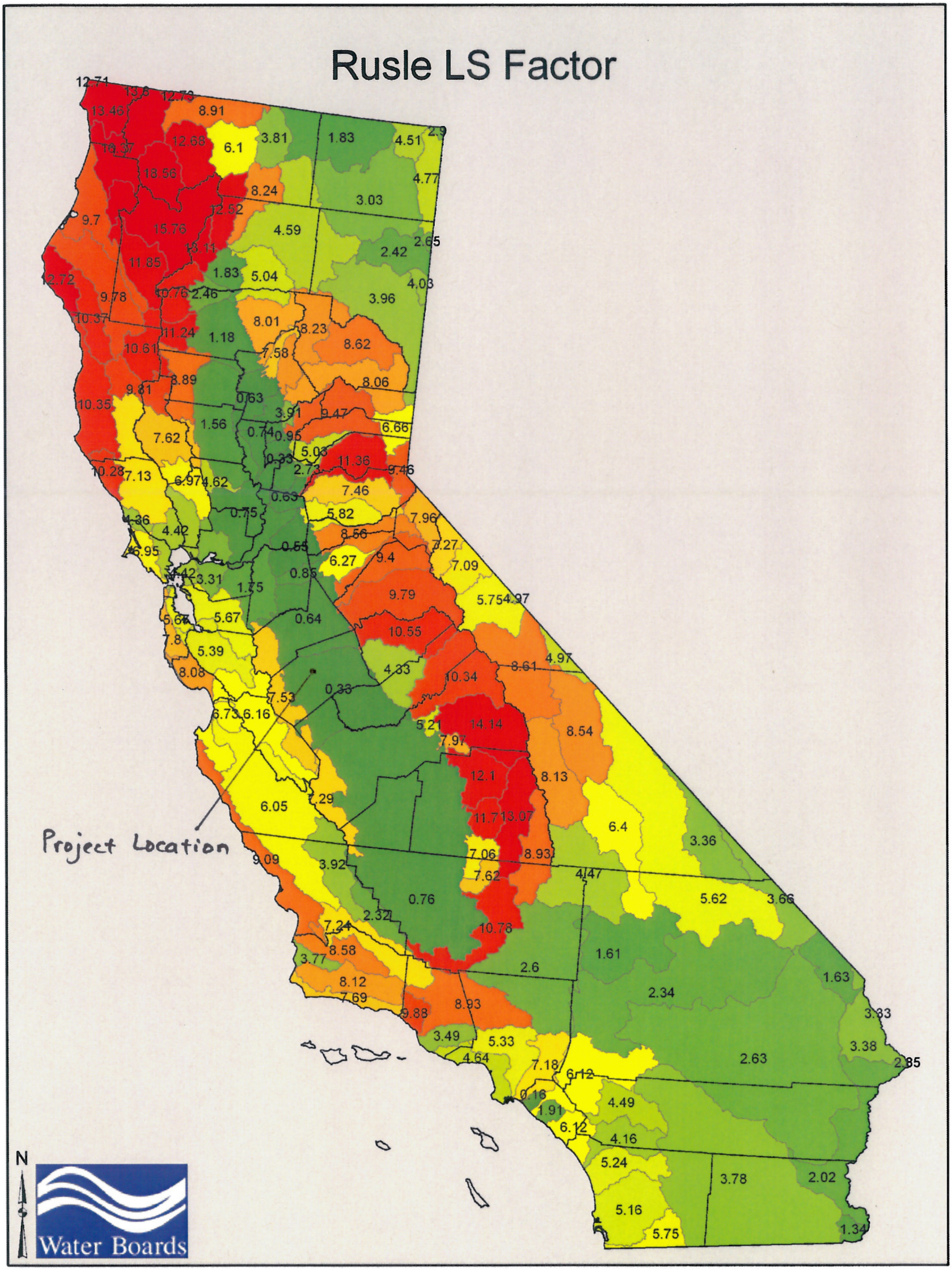
Last updated on August 07, 2009 3:37 PM
URL:http://cfpub.epa.gov/npdes/stormwater/LEW/erosivity_index_result.cfm

Rusle K Factor




Rusle LS Factor
Project Location
N
Water Boards

SUPPLEMENTAL ATTACHMENTS

STORM WATER BMP COST SUMMARY

CH2MHILL

PROJECT TITLE :	High Speed Train Project - Merced to Fresno	Sheet No.	1
	SR99 from Ashlan Ave to Clinton Ave*	Calculation No.	1
SUBJECT / FEATUTRE:	BMP Cost (Alternative 1)	Project No.	
		Calc By	WH Date 9/15/2010
		Checked By	RH Date 9/16/2010

PRINTED: 9/20/2010 9:04

Design Pollution Prevention BMP Cost

Item Description	Unit	Estimated Quantity Off-site	Unit Price	Total
Flared End Sections (Alt)	EA	10	$ 700	$ 7,000
Rock Slope Protection	YD3	122	$ 100	$ 12,200

Total	$ 19,200
Contingencies (20%)	$3,840
Grand Total	$ 23,040

Treatment BMP Cost

Item Description	Unit	Quantity	Unit Price	Total
Infiltration Basins	FT3	31,216	$ 21	$ 655,536
Bioswales	SY	27,065	$ 14	$ 378,910

Total	$ 1,034,446

* Costs shown pertain only to the impact location of SR99 from Ashlan Ave to Clinton Ave. Costs for other impact locations will be provided at a later stage.

CH2MHILL

PROJECT TITLE :	High Speed Train Project - Merced to Fresno	Sheet No.	1
	SR99 from Ashlan Ave to Clinton Ave*	Calculation No.	1
SUBJECT / FEATUTRE:	BMP Cost (Alternative 2)	Project No.	
		Calc By	WH Date 9/13/2010
		Checked By	RH Date 9/16/2010

PRINTED: 9/20/2010 9:04

Design Pollution Prevention BMP Cost

Item Description	Unit	Estimated Quantity Off-site	Unit Price	Total
Flared End Sections (Alt)	EA	10	$ 700	$ 7,000
Rock Slope Protection	YD3	122	$ 100	$ 12,200

Total	$	19,200
Contingencies (20%)		$3,840
Grand Total	$	23,040

Treatment BMP Cost

Item Description	Unit	Quantity	Unit Price	Total
Infiltration Basins	FT3	31,216	$ 21	$ 655,536
Infiltration Trenches	FT3	48,729	$ 42	$ 2,046,618
Bioswales	SY	24,349	$ 14	$ 340,886

Total	$	3,043,040

* Costs shown pertain only to the impact location of SR99 from Ashlan Ave to Clinton Ave. Costs for other impact locations will be provided at a later stage.

PROJECT PLANNING COST ESTIMATE (PPCE)

documented in this report, is therefore being conducted as a study separate from the Fresno to Bakersfield section.

Statewide agency agreements will be prepared with environmental resource agencies to support the environmental permitting required during final design and construction. These agreements, Memorandum of Understanding (MOU), and Memorandum of Agreement (MOA) or Programmatic Agreement (PA), will clearly identify the Authority's responsibilities in meeting the permitting requirements of the federal, state, and regional environmental resource agencies.

5. SCHEDULE & COSTS

The key milestone dates for the Central Valley section of the HSTP are as follows. All dates are subject to change and are subject to funding availability.

Caltrans Milestones	CHSRA Milestones	Delivery Date (Month, Day, Year)
NOI	NOI	3/16/2009
	Preliminary AA Report	3/16/2010
	Supplemental AA Report	9/8/2010
	15 percent design	12/31/2010
	Admin Draft EIR/EIS	9/24/2010
Circulate DED/Draft Project Report	Public Draft EIR/EIS	1/4/2011
	Final EIR/EIS	8/22/2011
PA&ED (approved PR and approved ED)	ROD/NOD	9/2/2011
	30 percent design	12/1/2011
Regular Right-of-Way		9/1/2011
Right-of-Way Certification		12/30/2011
Approve Contract	(Begin construction)	1/1/2012
Contract Acceptance	(end construction)	1/1/2018
End Project	(end project)	11/1/2018

Rail Alternative	Impact No.	Capital Cost ($ M)		
		Capital	Right-of-Way	Total
SR 59 Mainline Crossover near West 15th Street	1	$0	$0	$0
SR 99 Mainline Crossover near 15th Street Undercrossing	2	$0	$0	$0
SR 99/East Mission Avenue Interchange	3	$0	$0	$0
SR 99 Mainline Crossover near East Mission Avenue	4	$0	$0	$0
SR 99/Plainsburg Interchange	5	Option 1: $27 Option 2: $27	TBD	TBD
SR 145 Mainline Crossover near Road 28 1/2	6	$0	$0	$0
SR 99 Mainline Crossover near Avenue 21	7	$0	$0	$0

Rail Alternative	Impact No.	Capital Cost ($ M)		
		Capital	Right-of-Way	Total
SR 233 Mainline Crossover near Avenue $23^{1/2}$	8	$0	$0	$0
SR 99 Mainline Crossover near Avenue 24	9	$0	$0	$0
SB SR 99 On- and Off-Ramps near Chowchilla Boulevard	10	$0	$0	$0
SB SR 99 Off-Ramp	11	$0	$0	$0
SR 233 Mainline Crossover near SR 99/SR 233 Junction	12	$0	$0	$0
SB SR 99 On-Ramp	13	$0	$0	$0
SR9 99 Mainline Crossover near SR 99/SR 152 Junction	14	$0	$0	$0
Avenue $21^{1/2}$ /Road 20 Interchange	15	$0	$0	$0
SR 99/Avenue 20 and 20 ½ Interchange	16	Option 1: $18 Option 2: $18	TBD	TBD
Avenue $18^{1/2}$ Interchange	17	$0	$0	$0
Avenue 17 Interchange	18	$0	$0	$0
SR 145 mainline Crossover at 6th Street	19	$0	$0	$0
Avenue 13 Overcrossing	20	$0	$0	$0
Avenue 12 Interchange	21	$0	$0	$0
Avenue 11 Overcrossing	22	Option 1: $8 Option 2: $11	TBD	TBD
Avenue 9 Interchange	23	Option 1: $16 Option 2: $24	TBD	TBD
Avenue 8 Overcrossing	24	Option 1: $8 Option 2: $11	TBD	TBD
SR 99 near SR 152 Junction	25	$0	$0	$0
SR 99 Mainline Crossover near Avenue 20	26	$0	$0	$0
SR 99 Mainline Crossover near Road 19	27	$0	$0	$0
SR 99/SR 152 Junction	28	$0	$0	$0
SR 152 near Road 18	29	$0	$0	$0
SR 99 from Ashlan Avenue to Clinton Avenue	30	$80	TBD	TBD

6. FHWA/FRA COORDINATION

The FRA will coordinate with the FHWA as needed if freeway interchanges are required to be modified including modification to existing freeway right-of-way.

7. ATTACHMENTS

ATTACHMENT 1

Statewide HST System

ATTACHMENT 2

HST Section Map

CONCEPTUAL BMP AND DRAINAGE PLANS

REV	DATE	BY	CHK	APP	DESCRIPTION

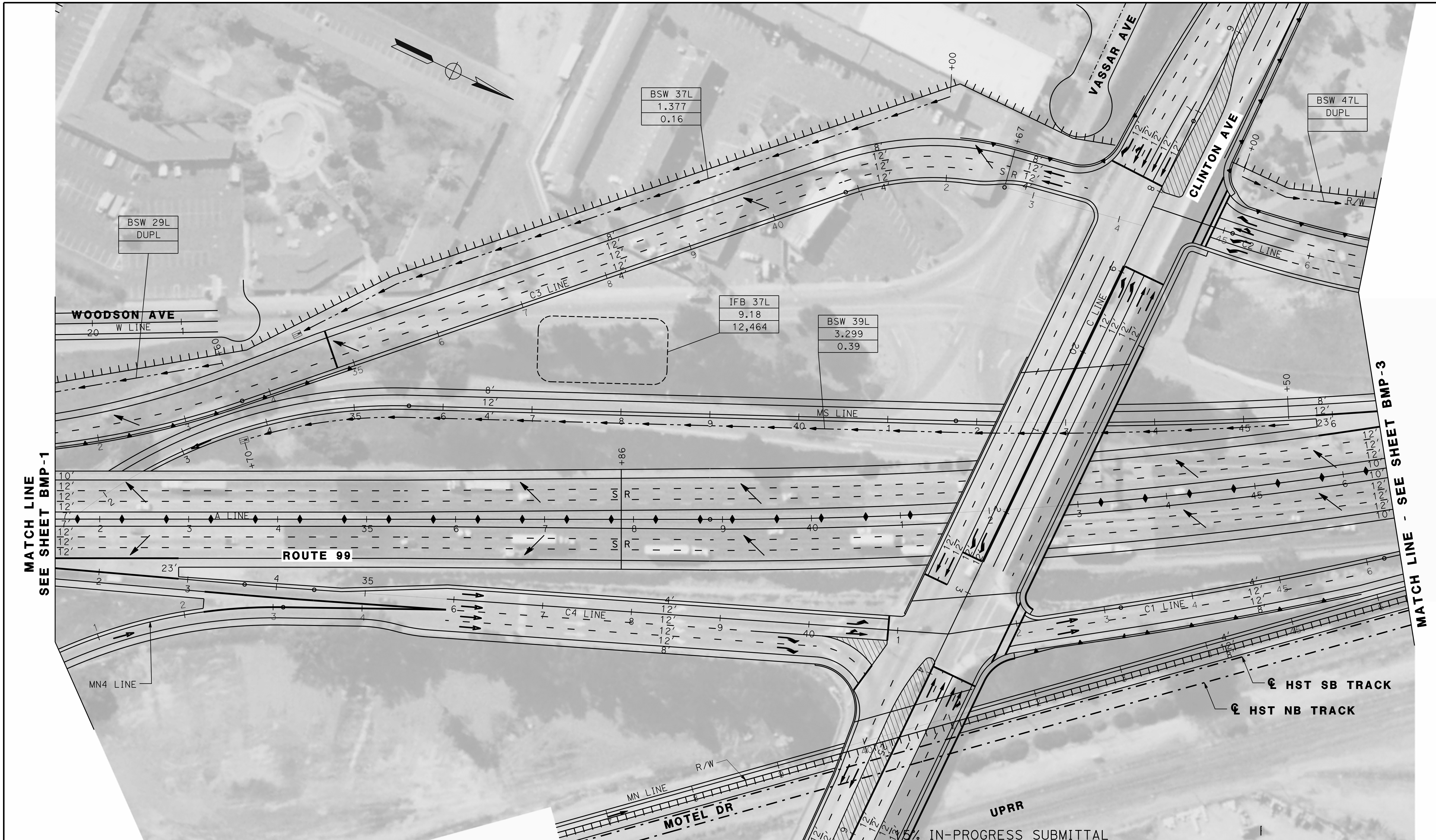
DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLY CALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-1
SCALE 1"= 50'
SHEET NO.



REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY

DRAWN BY

CHECKED BY

IN CHARGE

DATE

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CALIFORNIA HIGH SPEED RAIL AUTHORITY

FLY CALIFORNIA

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CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000

DRAWING NO. BMP-2

SCALE 1"= 50'

SHEET NO.

15% IN-PROGRESS SUBMITTAL

REV	DATE	BY	CHK	APP	DESCRIPTION

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DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-3
SCALE 1"= 50'
SHEET NO.

15% IN-PROGRESS SUBMITTAL

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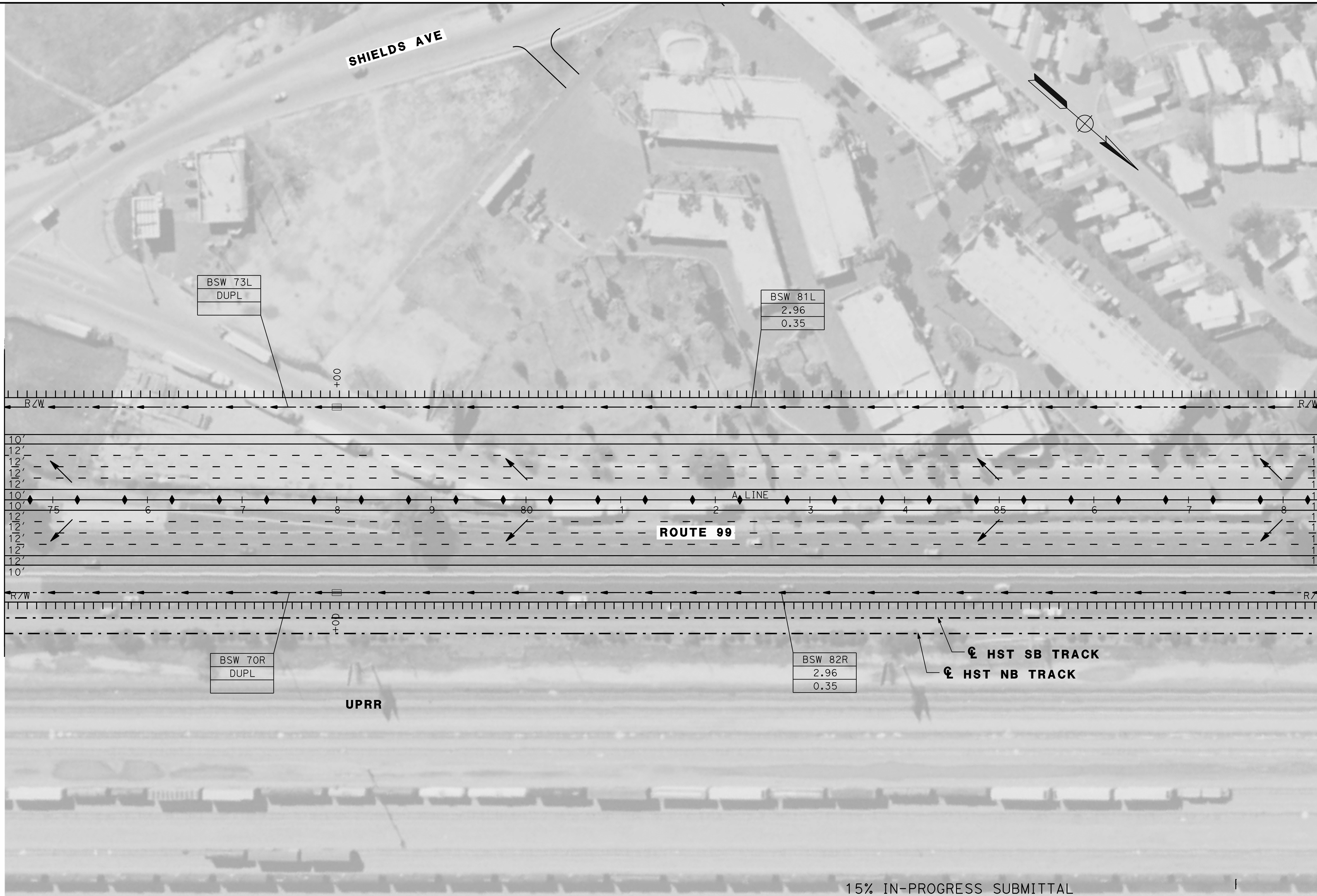
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-4
SCALE 1"= 50'
SHEET NO.



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CALIFORNIA HIGH SPEED RAIL AUTHORITY
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CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-5
SCALE 1"= 50'
SHEET NO.

15% IN-PROGRESS SUBMITTAL

REV	DATE	BY	CHK	APP	DESCRIPTION

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FLYCALIFORNIA
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CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-6
SCALE 1"= 50'
SHEET NO.

MATCH LINE - SEE SHEET BMP-6

MATCH LINE - SEE SHEET BMP-8

15% IN-PROGRESS SUBMITTAL

REV	DATE	BY	CHK	APP	DESCRIPTION

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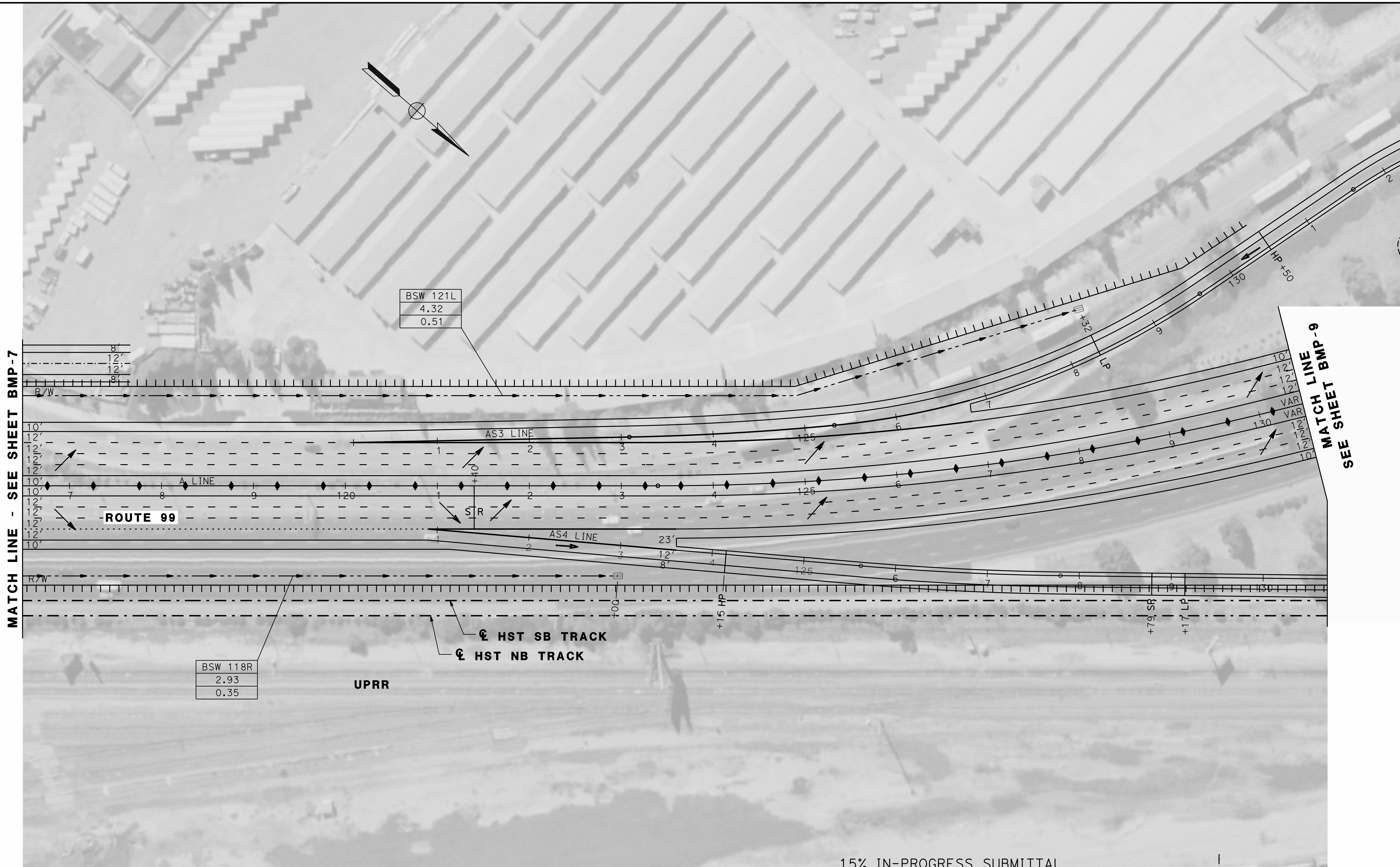
CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-7
SCALE 1"= 50'
SHEET NO.



REV	DATE	BY	CHK	APP	DESCRIPTION

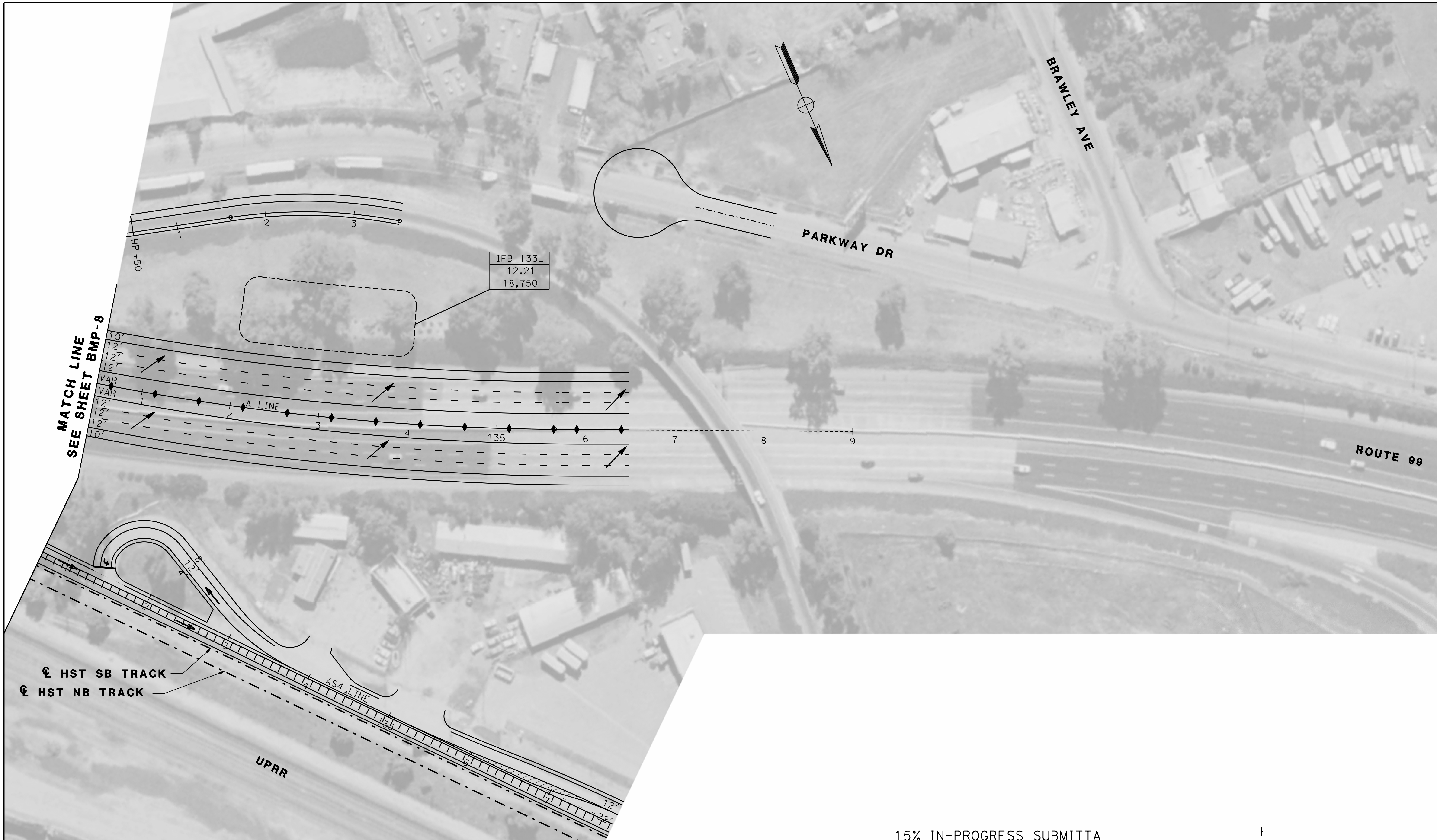
DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-8
SCALE 1"= 50'
SHEET NO.



15% IN-PROGRESS SUBMITTAL

REV	DATE	BY	CHK	APP	DESCRIPTION

DESIGNED BY
DRAWN BY
CHECKED BY
IN CHARGE
DATE

AECOM CH2MHILL

CALIFORNIA HIGH SPEED RAIL AUTHORITY
FLYCALIFORNIA
Without ever leaving the ground.

CALIFORNIA HIGH SPEED TRAIN PROJECT
MERCED TO FRESNO
ROUTE 99 RE-ALIGNMENT
DESIGN OPTION FRE-99-A
DRAINAGE AND BMP CONCEPT PLAN

CONTRACT NO. C-0-000
DRAWING NO. BMP-9
SCALE 1"= 50'
SHEET NO.

CHECKLISTS
SW-1, SW-2, SW-3, DPP-1, T-1

Checklist SW-1, Site Data Sources

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Information for the following data categories should be obtained, reviewed and referenced as necessary throughout the project planning phase. Collect any available documents pertaining to the category and list them and reference your data source. For specific examples of documents within these categories, refer to Section 5.5 of this document. Example categories have been listed below; add additional categories, as needed. Summarize pertinent information in Section 2 of the SWDR.

DATA CATEGORY/SOURCES	Date
Topographic	
• USGS Topo Quad Maps http://nmviewogc.cr.usgs.gov/viewer.htm	September 2, 2010
•	
Hydraulic	
• Water Quality Planning Tool www.stormwater.water-programs.com	September 2, 2010
•	
Soils	
• U.S. Department of Agriculture Natural Resources Conservation Service	September 2, 2010
• Merced to Fresno Section High Speed Train Project EIR/EIS	August 2010
•	
Climatic	
• Western Regional Climate Center (WRCC)	2009
•	
Water Quality	
• Water Quality Planning Tool www.stormwater.water-programs.com	September 2, 2010
• Basin Sizer Version 1.4	September 2, 2010
• Water Quality Control Plan (Basin Plan), Central Valley Region	September 2009
Other Data Categories	
• Caltrans Project Planning and Design Guide	July 2010
• Caltrans-High Speed Rail Authority Section Report	September 2010
• Caltrans Highway Design Manual	July 2009

Checklist SW-2, Storm Water Quality Issues Summary

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

The following questions provide a guide to collecting critical information relevant to project stormwater quality issues. Complete responses to applicable questions, consulting other Caltrans functional units (Environmental, Landscape Architecture, Maintenance, etc.) and the District/Regional Storm Water Coordinator as necessary. Summarize pertinent responses in Section 2 of the SWDR.

1. Determine the receiving waters that may be affected by the project throughout the project life cycle (i.e., construction, maintenance and operation). ☒Complete ☐NA
2. For the project limits, list the 303(d) impaired receiving water bodies and their constituents of concern. ☒Complete ☐NA
3. Determine if there are any municipal or domestic water supply reservoirs or groundwater percolation facilities within the project limits. Consider appropriate spill contamination and spill prevention control measures for these new areas. ☒Complete ☐NA
4. Determine the RWQCB special requirements, including TMDLs, effluent limits, etc. ☒Complete ☐NA
5. Determine regulatory agencies seasonal construction and construction exclusion dates or restrictions required by federal, state, or local agencies. ☒Complete ☐NA
6. Determine if a 401 certification will be required. ☒Complete ☐NA
7. List rainy season dates. ☒Complete ☐NA
8. Determine the general climate of the project area. Identify annual rainfall and rainfall intensity curves. ☒Complete ☐NA
9. If considering Treatment BMPs, determine the soil classification, permeability, erodibility, and depth to groundwater. ☒Complete ☐NA
10. Determine contaminated soils within the project area. ☒Complete ☐NA
11. Determine the total disturbed soil area of the project.

    Total disturbed soil area has been determined for encroachments that require substantial modifications to Caltrans facilities. Total disturbed soil areas for other impact locations will be determined at a later stage. ☐Complete ☐NA
12. Describe the topography of the project site. ☒Complete ☐NA
13. List any areas outside of the Caltrans right-of-way that will be included in the project (e.g. contractor's staging yard, work from barges, easements for staging, etc.). ☒Complete ☐NA

    Staged construction plans will be prepared during the PS&E phase. At this time, no staging areas are anticipated to be required outside the project limits.
14. Determine if additional right-of-way acquisition or easements and right-of-entry will be required for design, construction and maintenance of BMPs. If so, how much? ☒Complete ☐NA
15. Determine if a right-of-way certification is required. ☒Complete ☐NA
16. Determine the estimated unit costs for right-of-way should it be needed for Treatment BMPs, stabilized conveyance systems, lay-back slopes, or interception ditches. ☐Complete ☒NA
17. Determine if project area has any slope stabilization concerns. ☒Complete ☐NA

18. Describe the local land use within the project area and adjacent areas. ☒Complete ☐NA
19. Evaluate the presence of dry weather flow. ☒Complete ☐NA

Checklist SW-3, Measures for Avoiding or Reducing Potential Storm Water Impacts

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

The PE must confer with other functional units, such as Landscape Architecture, Hydraulics, Environmental, Materials, Construction and Maintenance, as needed to assess these issues. Summarize pertinent responses in Section 2 of the SWDR.

Options for avoiding or reducing potential impacts during project planning include the following:

1. Can the project be relocated or realigned to avoid/reduce impacts to receiving waters or to increase the preservation of critical (or problematic) areas such as floodplains, steep slopes, wetlands, and areas with erosive or unstable soil conditions? ☐Yes ☒No ☐NA
2. Can structures and bridges be designed or located to reduce work in live streams and minimize construction impacts? ☒Yes ☐No ☐NA
3. Can any of the following methods be utilized to minimize erosion from slopes:
   a. Disturbing existing slopes only when necessary? ☒Yes ☐No ☐NA
   b. Minimizing cut and fill areas to reduce slope lengths? ☒Yes ☐No ☐NA
   c. Incorporating retaining walls to reduce steepness of slopes or to shorten slopes? ☒Yes ☐No ☐NA
   d. Acquiring right-of-way easements (such as grading easements) to reduce steepness of slopes? ☒Yes ☐No ☐NA
   e. Avoiding soils or formations that will be particularly difficult to re-stabilize? ☒Yes ☐No ☐NA
   f. Providing cut and fill slopes flat enough to allow re-vegetation and limit erosion to pre-construction rates? ☒Yes ☐No ☐NA
   g. Providing benches or terraces on high cut and fill slopes to reduce concentration of flows? ☒Yes ☐No ☐NA
   h. Rounding and shaping slopes to reduce concentrated flow? ☒Yes ☐No ☐NA
   i. Collecting concentrated flows in stabilized drains and channels? ☒Yes ☐No ☐NA
4. Does the project design allow for the ease of maintaining all BMPs? ☒Yes ☐No
5. Can the project be scheduled or phased to minimize soil-disturbing work during the rainy season? ☒Yes ☐No
6. Can permanent storm water pollution controls such as paved slopes, vegetated slopes, basins, and conveyance systems be installed early in the construction process to provide additional protection and to possibly utilize them in addressing construction storm water impacts? ☒Yes ☐No ☐NA

Design Pollution Prevention BMPs

Checklist DPP-1, Part 1

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Consideration of Design Pollution Prevention BMPs

Consideration of Downstream Effects Related to Potentially Increased Flow [to streams or channels]

Will project increase velocity or volume of downstream flow?	☒Yes	☐No	☐NA
Will the project discharge to unlined channels?	☒Yes	☐No	☐NA
Will project increase potential sediment load of downstream flow?	☒Yes	☐No	☐NA
Will project encroach, cross, realign, or cause other hydraulic changes to a stream that may affect downstream channel stability?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Downstream Effects Related to Potentially Increased Flow***, complete the DPP-1, Part 2 checklist.

Slope/Surface Protection Systems

Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA

If Yes was answered to the above question, consider ***Slope/Surface Protection Systems***, complete the DPP-1, Part 3 checklist.

Concentrated Flow Conveyance Systems

Will the project create or modify ditches, dikes, berms, or swales?	☒Yes	☐No	☐NA
Will project create new slopes or modify existing slopes?	☒Yes	☐No	☐NA
Will it be necessary to direct or intercept surface runoff?	☒Yes	☐No	☐NA
Will cross drains be modified?	☒Yes	☐No	☐NA

If Yes was answered to any of the above questions, consider ***Concentrated Flow Conveyance Systems***; complete the DPP-1, Part 4 checklist.

Preservation of Existing Vegetation

It is the goal of the Storm Water Program to maximize the protection of desirable existing vegetation to provide erosion and sediment control benefits on all projects. ☒Complete

Consider ***Preservation of Existing Vegetation***, complete the DPP-1, Part 5 checklist.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 2

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Downstream Effects Related to Potentially Increased Flow

1. Review total paved area and reduce to the maximum extent practicable. ☒Complete
2. Review channel lining materials and design for stream bank erosion control. ☒Complete
   (a) See Chapters 860 and 870 of the HDM. ☒Complete
   (b) Consider channel erosion control measures within the project limits as well as downstream. Consider scour velocity. ☒Complete
3. Include, where appropriate, energy dissipation devices at culvert outlets. ☒Complete
4. Ensure all transitions between culvert outlets/headwalls/wingwalls and channels are smooth to reduce turbulence and scour. ☒Complete

   Final design will incorporate these transitions.
5. Include, if appropriate, peak flow attenuation basins or devices to reduce peak discharges. ☒Complete

   Detention basins are a potential Treatment BMP for this project.

Design Pollution Prevention BMPs
Checklist DPP-1, Part 3

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Slope / Surface Protection Systems

1. What are the proposed areas of cut and fill? (attach plan or map) ☒Complete
2. Were benches or terraces provided on high cut and fill slopes to reduce concentration of flows? ☐Yes ☒No
3. Were slopes rounded and/or shaped to reduce concentrated flow? ☒Yes ☐No
4. Were concentrated flows collected in stabilized drains or channels? ☒Yes ☐No
5. Are new or disturbed slopes > 4:1 horizontal:vertical (h:v)? ☒Yes ☐No

   If Yes, District Landscape Architect must prepare or approve an erosion control plan, at the District's discretion.
6. Are new or disturbed slopes > 2:1 (h:v)? ☐Yes ☒No

   If Yes, Geotechnical Services must prepare a Geotechnical Design Report, and the District Landscape Architect should prepare or approve an erosion control plan. Concurrence must be obtained from the District Maintenance Storm Water Coordinator for slopes steeper than 2:1 (h:v).
7. Estimate the net new impervious area that will result from this project. 3.4 acres ☒Complete

VEGETATED SURFACES

1. Identify existing vegetation. ☒Complete
2. Evaluate site to determine soil types, appropriate vegetation and planting strategies. ☒Complete
3. How long will it take for permanent vegetation to establish? ☒Complete
4. Minimize overland and concentrated flow depths and velocities. ☒Complete

HARD SURFACES

1. Are hard surfaces required? ☒Yes ☐No

   If Yes, document purpose (safety, maintenance, soil stabilization, etc.), types, and general locations of the installations. ☒Complete

Review appropriate SSPs for Vegetated Surface and Hard Surface Protection Systems. ☒Complete

Design Pollution Prevention BMPs
Checklist DPP-1, Part 4

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Concentrated Flow Conveyance Systems

Ditches, Berms, Dikes and Swales

1. Consider Ditches, Berms, Dikes, and Swales as per Topics 813, 834.3, and 835, and Chapter 860 of the HDM. ☒Complete
2. Evaluate risks due to erosion, overtopping, flow backups or washout.
   Positive drainage will be provided for all drainage systems. Hydraulic modeling will be completed during the PS&E phase. ☒Complete
3. Consider outlet protection where localized scour is anticipated.
   Outlet protection (e.g., RSP) will be incorporated during the PS&E phase. ☒Complete
4. Examine the site for run-on from off-site sources.
   Cross drainage will be provided for run-on from off-site sources. ☒Complete
5. Consider channel lining when velocities exceed scour velocity for soil.
   Channel lining will be incorporated during the design phase where appropriate. ☒Complete

Overside Drains

1. Consider downdrains, as per Index 834.4 of the HDM. ☒Complete
2. Consider paved spillways for side slopes flatter than 4:1 h:v. ☒Complete

Flared Culvert End Sections

1. Consider flared end sections on culvert inlets and outlets as per Chapter 827 of the HDM. ☒Complete

Outlet Protection/Velocity Dissipation Devices

1. Consider outlet protection/velocity dissipation devices at outlets, including cross drains, as per Chapters 827 and 870 of the HDM. ☒Complete

Review appropriate SSPs for Concentrated Flow Conveyance Systems. ☒Complete

Design Pollution Prevention BMPs

Checklist DPP-1, Part 5

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Preservation of Existing Vegetation

1. Review Preservation of Property, Standard Specifications 16.1.01 and 16-1.02 (Clearing and Grubbing) to reduce clearing and grubbing and maximize preservation of existing vegetation. ☒Complete

2. Has all vegetation to be retained been coordinated with Environmental, and identified and defined in the contract plans? ☒Yes ☐No

3. Have steps been taken to minimize disturbed areas, such as locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling? ☒Complete

4. Have impacts to preserved vegetation been considered while work is occurring in disturbed areas? ☒Yes ☐No

5. Are all areas to be preserved delineated on the plans? ☐Yes ☒No

   These areas will be delineated during the PS&E phase.

Treatment BMPs
Checklist T-1, Part 1

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Consideration of Treatment BMPs

This checklist is used for projects that require the consideration of Approved Treatment BMPs, as determined from the process described in Section 4 (Project Treatment Consideration) and the Evaluation Documentation Form (EDF). This checklist will be used to determine which Treatment BMPs should be considered for each watershed and sub-watershed within the project. Supplemental data will be needed to verify siting and design applicability for final incorporation into a project.

Complete this checklist for each phase of the project, when considering Treatment BMPs. Use the responses to the questions as the basis when developing the narrative in Section 5 of the Storm Water Data Report to document that Treatment BMPs have been appropriately considered.

Answer all questions, unless otherwise directed. Questions 14 through 16 should be answered after all subwatershed (drainages) are considered using this checklist.

1. Is the project in a watershed with prescriptive TMDL treatment BMP requirements in an adopted TMDL implementation plan? ☐Yes ☒No

   If Yes, consult the District/Regional Storm Water Coordinator to determine whether the T-1 checklist should be used to propose alternative BMPs because the prescribed BMPs may not be feasible or other BMPs may be more cost-effective. Special documentation and regulatory response may be necessary.

2. Dry Weather Flow Diversion

   (a) Are dry weather flows generated by Caltrans anticipated to be persistent? ☐Yes ☒No

   (b) Is a sanitary sewer located on or near the site? ☒Yes ☐No

   If Yes to both 2 (a) and (b), continue to (c). If No to either, skip to question 3.

   (c) Is connection to the sanitary sewer possible without extraordinary plumbing, features or construction practices? ☐Yes ☐No

   (d) Is the domestic wastewater treatment authority willing to accept flow? ☐Yes ☐No

   If Yes was answered to all of these questions consider ***Dry Weather Flow Diversion***, complete and attach **Part 3** of this checklist

3. Is the receiving water on the 303(d) list for litter/trash or has a TMDL been issued for litter/trash? ☐Yes ☒No

If Yes, consider ***Gross Solids Removal Devices (GSRDs)***, complete and attach **Part 6** of this checklist. Note: Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins also can capture litter. Before considering GSRDs for stand-alone installation or in sequence with other BMPs, consult with District/Regional NPDES Storm Water Coordinator to determine whether Infiltration Devices, Detention Devices, Media Filters, MCTTs, and Wet Basins should be considered instead of GSRDs to meet litter/trash TMDL.

4. Is project located in an area (e.g., mountain regions) where traction sand is applied more than twice a year? ☐**Yes** ☒**No**

   If Yes, consider ***Traction Sand Traps***, complete and attach **Part 7** of this checklist.

5. Maximizing Biofiltration Strips and Swales ☒**Yes** ☐**No**

   Objectives:

   1) Quantify infiltration from biofiltration alone

   2) Identify highly infiltrating biofiltration (i.e. > 90%) and skip further BMP consideration.

   3) Identify whether amendments can substantially improve infiltration.

   (a) Have biofiltration strips and swales been designed for runoff from all project areas, including sheet flow and concentrated flow conveyance? If no, document justification in Section 5 of the SWDR. ☒**Yes** ☐**No**

   (b) Based on site conditions, estimate what percentage of the WQV can be infiltrated. Use the 12-hour WQV for Type A and B soils, the 24-hour WQV for Type C soils, and the 48-hour WQV for Type D soil.

   All four soil types are present within the study area. Even though Type D is the predominant soil within the project limits, Type B and Type C soils are also quite prevalent, with small bands of Type A soil scattered in the central and southern portions of the study area. The infiltration capacity of the soils will be dependent on site-specific properties of the soil where the BMP is proposed. The soil type will need to be confirmed by field testing prior to construction. At this time, the infiltration capacity of the BMPs cannot be determined. ☒**Complete**

   ___ < 20%
   ___ 20 % - 50%
   ___ 50% - 90%
   ___ > 90%

   (c) Is infiltration greater than 90 percent? If Yes, skip to question 13.

   Please see response to Question 5b. ☐**Yes** ☐**No**

(d) Can the infiltration ranking in question 5(b) above be increased by using soil amendments? Use the 'drain time' associated with the amended soil (the 12-hour WQV for Type A and B soils, the 24-hour WQV for Type C soils[1]). ☒Yes ☐No

Soil amendments will be considered during the PS&E phase.

If Yes, consider including soil amendments; increasing the infiltration ranking allows more flexibility in the selection of BMPs (strips and swales will show performance comparable to other BMPs). Record the new infiltration estimate below:

Please see response to Question 5b.

☒Complete

___ < 20% (skip to 6)
___ 20 % - 50% (skip to 6)
___ 50% - 90% (skip to 6)
___ >90%

(e) Is infiltration greater than 90 percent? If Yes, skip to question 13. ☐Yes ☐No

Please see response to Question 5b.

6. Biofiltration in Rural Areas

Is the project in a rural area (outside of urban areas that is covered under an NDPES Municipal Stormwater Permit[2]). If Yes proceed to question 13. ☐Yes ☒No

7. Estimating Infiltration for BMP Combinations

Objectives:

1) Identify high-infiltration biofiltration or biofiltration and infiltration BMP combinations and skip further BMP consideration.

2) If high infiltration is infeasible, then identify the infiltration level of all feasible BMP combinations for use in the subsequent BMP selection matrices

(a) Has concentrated infiltration (i.e., via earthen basins or earthen filters) been prohibited? Consult your District/Regional Storm Water Coordinator and/or environmental documents. ☐Yes ☒No

---

[1] **Type D soils are not expected where amendments are incorporated.**

[2] **See pages 39 and 40 of the Fact Sheets for the CGP.**
http://www.waterboards.ca.gov/water_issues/programs/stormwater/docs/constpermits/wqo_2009_0009_factsheet.pdf

If No proceed to 7 (b); if Yes skip to question 8 and do not consider earthen basin-type BMPs

(b) Assess infiltration of an infiltration BMP that is used in conjunction with biofiltration. Include infiltration losses from biofiltration, if biofiltration is feasible. ☐Complete

Please see response to Question 5b.

(use 24 hr WQV)

___ < 20% (do not consider this BMP combination)

___ 20% - 50%

___ 50% - 90%

___ >90%

Is at least 90 percent infiltration estimated? If Yes proceed to 13. If No proceed to 7(c). ☐**Yes** ☐**No**

(c) Assess infiltration of biofiltration with combinations with remaining approved earthen BMPs using water quality volumes based on the drain time of those BMPs. This assessment will be used in subsequent BMP selection matrices.

Please see response to Question 5b.

Earthen Detention Basin (use 48 hr WQV)	Earthen Austin SF (use 48 hr WQV)	
___ < 20%	___ < 20%	☐Complete
___ 20% - 50%	___ 20% - 50%	
___ > 50%	___ > 50%	

Continue to Question 8.

8. Identifying BMPs based on the Target Design Constituents

(a) Does the project discharge to a water body that has been placed on the 303-d list or has had a TMDL adopted? If "No," use Matrix A to select BMPs, consider designing to treat 100% of the WQV, then skip to question 12. ☒**Yes** ☐**No**

If Yes, is the identified pollutant(s) considered a Targeted Design Constituent (TDC) (check all that apply below)?

☐ sediments ☐ copper (dissolved or total)

☐ phosphorus ☐ lead (dissolved or total)

☐ nitrogen ☐ zinc (dissolved or total)

☐ general metals (dissolved or total)[3]

[3] General metals include cadmium, nickel, chromium, and other trace metals. Note that selenium and arsenic are not metals. Mercury is a metal, but is considered later during BMP selection, under Question 12 below.

(b) Treating Sediment. Is sediment the only TDC? If Yes, use Matrix A to select BMPs, then skip to question 12. Otherwise, proceed to question 9. ☐Yes ☒No

BMP Selection Matrix A: General Purpose Pollutant Removal			
Consider approaches to treat 100% of the WQV with combinations of the BMPs in this table. The highest preference is for Tier 1, followed by Tier 2. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs that infiltrate should be highlighted in the infiltration category summarized in question 7 (f) and listings of BMPs that infiltrate in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Strip: HRT > 5 Austin filter (concrete) Austin filter (earthen) Delaware filter MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Swale MCTT Wet basin	Austin filter (concrete) Delaware filter MCTT Wet basin
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

9. Treating both Metals and Nutrients.

   Is copper, lead, zinc, or general metals *AND* nitrogen or phosphorous a TDC? If Yes use Matrix D to select BMPs, then skip to question 12. Otherwise, proceed to question 10. ☐Yes ☒No

10. Treating Only Metals.

    Are copper, lead, zinc, or general metals listed TDCs? If Yes use Matrix B below to select BMPs, and skip to question 12. Otherwise, proceed to question 11. ☐Yes ☒No

BMP Selection Matrix B: Any metal is the TDC, but not nitrogen or phosphorous			
Consider approaches to treat 100% of the WQV with combinations of the BMPs in this table. The highest preference is for Tier 1, followed by Tier 2. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs that infiltrate should be highlighted in the infiltration category summarized in question 7 (f) and listings of BMPs that infiltrate in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	MCTT Wet basin Austin filter (earthen) Austin filter (concrete) Delaware filter	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Wet basin	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* MCTT Biofiltration Strip Biofiltration Swale Wet basin
Tier 2	Strip: HRT > 5 Strip: HRT < 5 Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter
HRT = hydraulic residence time (min) *Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			

11. Treating Only Nutrients.
    Are nitrogen and/or phosphorus listed TDCs? If "Yes," use Matrix C to select BMPs. If "No", please check your answer to 8(a). At this point one of the matrices should have been used for BMP selection for the TDC in question, unless no BMPs are feasible. ☐**Yes** ☒**No**

BMP Selection Matrix C: Phosphorous and / or nitrogen is the TDC, but no metals are the TDC			
Consider approaches to treat 100% of the WQV with combinations of the BMPs in this table. The highest preference is for Tier 1, followed by Tier 2. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs that infiltrate should be highlighted in the infiltration category summarized in question 7 (f) and listings of BMPs that infiltrate in other categories should be ignored.			
	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Austin filter (earthen) Austin filter (concrete) Delaware filter**	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches*	Austin filter (earthen) Detention (unlined) Infiltration basins* Infiltration trenches* Biofiltration Strip Biofiltration Swale
Tier 2	Wet basin Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale Wet basin	Austin filter (concrete) Delaware filter Wet basin
* Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.			
** Delaware filters would be ranked in Tier 2 if the TDC is nitrogen only, as opposed to phosphorous only or both nitrogen and phosphorous.			

BMP Selection Matrix D: Any metal, plus phosphorous and / or nitrogen are the TDCs

Consider approaches to treat 100% of the WQV with combinations of the BMPs in this table. The highest preference is for Tier 1, followed by Tier 2. Within each Tier, BMP selection will be determined by the site-specific determination of feasibility (Section 2.4.2.1). BMPs that infiltrate should be highlighted in the infiltration category summarized in question 7 (f) and listings of BMPs that infiltrate in other categories should be ignored.

	BMP ranking for infiltration category:		
	Infiltration < 20%	Infiltration 20% - 50%	Infiltration > 50%
Tier 1	Wet basin* Austin filter (earthen) Austin filter (concrete) Delaware filter**	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches***	Wet basin* Austin filter (earthen) Detention (unlined) Infiltration basins*** Infiltration trenches*** Biofiltration Strip Biofiltration Swale
Tier 2	Biofiltration Strip Biofiltration Swale Detention (unlined)	Austin filter (concrete) Delaware filter Biofiltration Strip Biofiltration Swale	Austin filter (concrete) Delaware filter

* The wet basin should only be considered for phosphorus

** In cases where earthen BMPs can infiltrate, Delaware filters are ranked in Tier 2 if the TDC is nitrogen only, but they are Tier 1 for phosphorous only or both nitrogen and phosphorous.

*** Infiltration BMPs that infiltrate the water quality volume were considered previously, so only undersized infiltration BMPs or hybrid designs are considered where infiltration is less than 90% of the water quality volume.

12. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for mercury or low dissolved oxygen? ☒Yes ☐No

    If Yes contact the District/Regional NPDES Storm Water Coordinator to determine if standing water in a Delaware filter, wet basin, or MCTT would be a risk to downstream water quality.

    Coordination will be done during the design phase.

13. After completing the above, identify and attach the checklists shown below for every Treatment BMP under consideration. (use one checklist every time the BMP is considered for a different drainage within the project) ☒Complete

    __√_ Biofiltration Strips and Biofiltration Swales: Checklist T-1, Part 2
    ____ Dry Weather Diversion: Checklist T-1, Part 3
    __√_ Infiltration Devices: Checklist T-1, Part 4
    __√_ Detention Devices: Checklist T-1, Part 5
    ____ GSRDs: Checklist T-1, Part 6
    ____ Traction Sand Traps: Checklist T-1, Part 7
    __√_ Media Filter [Austin Sand Filter and Delaware Filter]: Checklist T-1, Part 8
    __√_ Multi-Chambered Treatment Train: Checklist T-1, Part 9
    __√_ Wet Basins: Checklist T-1, Part 10

14. Estimate what percentage of WQV (or WQF, depending upon the Treatment BMP selected) will be treated by the preferred Treatment BMP(s): ____76______% ☐Complete

    The percentage of WQV/WQF has been determined for the SR 99 realignment portion of the project. The percentage of WQV/WQF for other impact locations will be determined at a later stage.

    (a) Have Treatment BMPs been considered for use in parallel or series to increase this percentage? ☒Yes ☐No

15. Estimate what percentage of the net WQV (for all new impervious surfaces within the project) that will be treated by the preferred treatment BMP(s): _____8795_____% ☐Complete

    The percentage of the net WQV has been determined for the SR 99 realignment portion of the project. The percentage of the net WQV for other impact locations will be determined at a later stage.

16. Prepare cost estimate, including right-of-way, and site specific determination of feasibility (Section 2.4.2.1) for selected Treatment BMPs and include as supplemental information for SWDR approval. ☒Complete

Treatment BMPs
Checklist T-1, Part 2

Prepared by:___W. Hsu___Date:__Jan 14, 2011___District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM :___Various_______Project ID (or EA):_____0600020014___RWQCB:__Central Valley Region 5____

Biofiltration Swales / Biofiltration Strips

Feasibility

1. Do the climate and site conditions allow vegetation to be established? ☒Yes ☐No
2. Are flow velocities from a peak drainage facility design event < 4 fps (i.e. low enough to prevent scour of the vegetated biofiltration swale as per HDM Table 873.3E)? ☒Yes ☐No

If "No" to either question above, Biofiltration Swales and Biofiltration Strips are not feasible.

3. Are Biofiltration Swales proposed at sites where known contaminated soils or groundwater plumes exist? ☐Yes ☒No
If "Yes", consult with District/Regional NPDES Coordinator about how to proceed.
4. Does adequate area exist within the right-of-way to place Biofiltration device(s)? ☒Yes ☐No
If "Yes", continue to Design Elements section. If "No", continue to Question 5.
5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Biofiltration devices and how much right-of-way would be needed to treat WQF? __________ acres ☐Yes ☐No
If "Yes", continue to Design Elements section. If "No", continue to Question 6.
6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of these Treatment BMPs into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the District Landscape Architect provided vegetation mixes appropriate for climate and location? * ☐Yes ☒No

2. Can the biofiltration swale be designed as a conveyance system under any expected flows > the WQF event, as per HDM Chapter 800? * (e.g. freeboard, minimum slope, etc.) ☒Yes ☐No

3. Can the biofiltration swale be designed as a water quality treatment device under the WQF while meeting the required HRT, depth, and velocity criteria? (Reference Appendix B, Section B.2.3.1)* ☒Yes ☐No

4. Is the maximum length of a biofiltration strip ≤ 300 ft? * ☒Yes ☐No

5. Has the minimum width (in the direction of flow) of the invert of the biofiltration swale received the concurrence of Maintenance? * ☐Yes ☒No

6. Can biofiltration swales be located in natural or low cut sections to reduce maintenance problems caused by animals burrowing through the berm of the swale? ** ☒Yes ☐No

7. Is the biofiltration strip sized as long as possible in the direction of flow? ** ☒Yes ☐No

8. Have Biofiltration Systems been considered for locations upstream of other Treatment BMPs, as part of a treatment train? ** ☒Yes ☐No

Treatment BMPs
Checklist T-1, Part 4

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Infiltration Devices

Feasibility

1. Does local Basin Plan or other local ordinance provide influent limits on quality of water that can be infiltrated, and would infiltration pose a threat to groundwater quality? ☐Yes ☒No
2. Does infiltration at the site compromise the integrity of any slopes in the area? ☐Yes ☒No
3. Per survey data or U.S. Geological Survey (USGS) Quad Map, are existing slopes at the proposed device site >15%? ☐Yes ☒No
4. At the invert, does the soil type classify as NRCS Hydrologic Soil Group (HSG) D, or does the soil have an infiltration rate < 0.5 inches/hr? ☐Yes ☒No
5. Is site located over a previously identified contaminated groundwater plume? ☐Yes ☒No

   If "Yes" to any question above, Infiltration Devices are not feasible; stop here and consider other approved Treatment BMPs.

6. (a) Does site have groundwater within 10 ft of basin invert? ☐Yes ☒No

   (b) Does site investigation indicate that the infiltration rate is significantly greater than 2.5 inches/hr? ☐Yes ☒No

   If "Yes" to either part of Question 6, the RWQCB must be consulted, and the RWQCB must conclude that the groundwater quality will not be compromised, before approving the site for infiltration. ☐Yes ☐No

7. Does adequate area exist within the right-of-way to place Infiltration Device(s)? If "Yes", continue to Design Elements sections. If "No", continue to Question 8. ☒Yes ☐No
8. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Infiltration Devices and how much right-of-way would be needed to treat WQV? __________ acres ☐Yes ☐No

   If Yes, continue to Design Elements section.

   If No, continue to Question 9.

9. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

Design Elements – Infiltration Basin

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) * *This will be done during the PS&E phase.*	☐Yes	☒No
2.	Has an overflow spillway with scour protection been provided? * *This will be incorporated during the PS&E phase.*	☐Yes	☒No
3.	Is the Infiltration Basin size sufficient to capture the WQV while maintaining a 40-48 hour drawdown time? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) *	☒Yes	☐No
4.	Can access be placed to the invert of the Infiltration Basin? *	☒Yes	☐No
5.	Can the Infiltration Basin accommodate the freeboard above the overflow event elevation (reference Appendix B.1.3.1)? *	☒Yes	☐No
6.	Can the Infiltration Basin be designed with interior side slopes no steeper than 4:1 (h:v) (may be 3:1 [h:v] with approval by District Maintenance)? *	☒Yes	☐No
7.	Can vegetation be established in the Infiltration Basin? **	☒Yes	☐No
8.	Can diversion be designed, constructed, and maintained to bypass flows exceeding the WQV? **	☒Yes	☐No
9.	Can a gravity-fed Maintenance Drain be placed? **	☒Yes	☐No

Design Elements – Infiltration Trench

* **Required** Design Element – (see definition above)

** **Recommended** Design Element – (see definition above)

1.	Has a detailed investigation been conducted, including subsurface soil investigation, in-hole conductivity testing and groundwater elevation determination? (This report must be completed for PS&E level design.) * *This will be done during the PS&E phase.*	☐Yes	☒No
2.	Is the surrounding soil within Hydrologic Soil Groups (HSG) Types A or B? *	☒Yes	☐No
3.	Is the volume of the Infiltration Trench equal to at least the 2.85x the WQV, while maintaining a drawdown time of ≤ 96 hours? It is recommended to use a drawdown time between 40 and 48 hours. (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], unless the District/Regional NPDES Storm Water Coordinator will allow a volume between 2,830 ft^3 and 4,356 ft^3 to be considered.) *	☒Yes	☐No
4.	Is the depth of the Infiltration Trench ≤ 13 ft? *	☒Yes	☐No
5.	Can an observation well be placed in the trench? *	☒Yes	☐No
6.	Can access be provided to the Infiltration Trench? *	☒Yes	☐No
7.	Can pretreatment be provided to capture sediment in the runoff (such as using vegetation)? *	☒Yes	☐No

8. Can flow diversion be designed, constructed, and maintained to bypass flows exceeding the Water Quality event? ** ☒Yes ☐No

9. Can a perimeter curb or similar device be provided (to limit wheel loads upon the trench)? ** ☒Yes ☐No

Treatment BMPs

Checklist T-1, Part 5

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Detention Devices

Feasibility

1. Is there sufficient head to prevent objectionable backwater conditions in the upstream drainage systems? ☒Yes ☐No

2. 2a) Is the volume of the Detention Device equal to at least the WQV? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) ☒Yes ☐No

   Only answer (b) if the Detention Device is being used also to capture traction sand.

   2b) Is the total volume of the Detention Device at least equal to the WQV plus the anticipated volume of traction sand, while maintaining a minimum 12 inch freeboard (1 ft)? ☐Yes ☐No

3. Is basin invert ≥ 10 ft above seasonally high groundwater or can it be designed with an impermeable liner? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.) ☒Yes ☐No

If No to any question above, then Detention Devices are not feasible.

4. Does adequate area exist within the right-of-way to place Detention Device(s)? ☒Yes ☐No

   If Yes, continue to the Design Elements section. If No, continue to Question 5.

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site Detention Device(s) and how much right-of way would be needed to treat WQV? __________ acres ☐Yes ☐No

   If Yes, continue to the Design Elements section. If No, continue to Question 6.

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Has the geotechnical integrity of the site been evaluated to determine potential impacts to surrounding slopes due to incidental infiltration? If incidental infiltration through the invert of an unlined Detention Device is a concern, consider using an impermeable liner. * ☐Yes ☒No

   This will be investigated during the PS&E phase.

2. Has the location of the Detention Device been evaluated for any effects to the adjacent roadway and subgrade? * ☒Yes ☐No
3. Can a minimum freeboard of 12 inches be provided above the overflow event elevation? * ☒Yes ☐No
4. Is an overflow outlet provided? * ☒Yes ☐No
5. Is the drawdown time of the Detention Device within 24 to 72 hours with 40-hrs the preferred design drawdown time? * ☒Yes ☐No
6. Is the basin outlet designed to minimize clogging (minimum outlet orifice diameter of 0.5 inches)? * ☒Yes ☐No
7. Are the inlet and outlet structures designed to prevent scour and re-suspension of settled materials, and to enhance quiescent conditions? * ☒Yes ☐No
8. Can vegetation be established in an earthen basin at the invert and on the side slopes for erosion control and to minimize re-suspension? Note: Detention Basins may be lined, in which case no vegetation would be required for lined areas.* ☒Yes ☐No
9. Has sufficient access for Maintenance been provided? * ☒Yes ☐No
10. Is the side slope 4:1 (h:v) or flatter for interior slopes? ** ☒Yes ☐No
    (Note: Side slopes up to 3:1 (h:v) allowed with approval by District Maintenance.)
11. If significant sediment is expected from nearby slopes, can the Detention Device be designed with additional volume equal to the expected annual loading? ** ☒Yes ☐No
12. Is flow path as long as possible (≥ 2:1 length to width ratio at WQV elevation is recommended)? ** ☒Yes ☐No

Treatment BMPs

Checklist T-1, Part 8

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Media Filters

Caltrans has approved two types of Media Filter: Austin Sand Filters and Delaware Filters. Austin Sand filters are typically designed for larger drainage areas, while Delaware Filters are typically designed for smaller drainage areas. The Austin Sand Filter is constructed with an open top and may have a concrete or earthen invert, while the Delaware is always constructed as a vault. See Appendix B, Media Filters, for a further description of Media Filters.

Feasibility – Austin Sand Filter

1. Is the volume of the Austin Sand Filter equal to at least the WQV using a 24 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet]) ☒Yes ☐No
2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☒Yes ☐No
3. If initial chamber has an earthen bottom, is initial chamber invert ≥ 3 ft above seasonally high groundwater? ☒Yes ☐No
4. If a vault is used for either chamber, is the level of the concrete base of the vault above seasonally high groundwater or is a special design provided? ☒Yes ☐No

   If No to any question above, then an Austin Sand Filter is not feasible.
5. Does adequate area exist within the right-of-way to place an Austin Sand Filter(s)? ☒Yes ☐No

   If Yes, continue to Design Elements sections. If No, continue to Question 6.
6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _________ acres ☐Yes ☐No

   If Yes, continue to the Design Elements section.

   If No, continue to Question 7.
7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

   If an Austin Sand Filter meets these feasibility requirements, continue to the Design Elements – Austin Sand Filter below.

Feasibility - Delaware Filter

1. Is the volume of the Delaware Filter equal to at least the WQV using a 40 to 48 hour drawdown? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet], consult with District/Regional Design Storm Water Coordinator if a lesser volume is under consideration.) ☒Yes ☐No

2. Is there sufficient hydraulic head to operate the device (minimum 3 ft between the inflow and outflow chambers)? ☒Yes ☐No

3. Would a permanent pool of water be allowed by the local vector control agency? Confirm that check valves and vector proof lid as shown on standard detail sheets will be allowed, is used. ☐Yes ☒No

If No to any question, then a Delaware Filter is not feasible

4. Does adequate area exist within the right-of-way to place a Delaware Filter (s)? If Yes, continue to Design Elements sections. If No, continue to Question 5. ☐Yes ☐No

5. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _________ acres If Yes, continue to the Design Elements section. If No, continue to Question 6. ☐Yes ☐No

6. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

7. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, or low dissolved oxygen? ☐Yes ☐No

   If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

   If a Delaware Filter is still under consideration, continue to the Design Elements – Delaware Filter section.

Design Elements – Austin Sand Filter

* **Required** Design Element – A “Yes” response to these questions is required to further the consideration of this BMP into the project design. Document a “No” response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A “Yes” response is preferred for these questions, but not required for incorporation into a project design.

1. Is the drawdown time of the 2nd chamber 24 hours? * ☒Yes ☐No
2. Is access for Maintenance vehicles provided to the Austin Sand Filter? * ☒Yes ☐No
3. Is a bypass/overflow provided for storms > WQV? * ☒Yes ☐No
4. Is the flow path length to width ratio for the sedimentation chamber of the “full” Austin Sand Filter ≥ 2:1? ** ☒Yes ☐No
5. Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? ** ☒Yes ☐No

   This will be investigated during the PS&E phase.
6. Can the Austin Sand Filter be placed using an earthen configuration? ** ☒Yes ☐No

   If No, go to Question 9.

   This will be investigated during the PS&E phase.
7. Is the Austin Sand Filter invert separated from the seasonally high groundwater table by ≥ 10 ft)? * ☒Yes ☐No

   If No, design with an impermeable liner.
8. Are side slopes of the earthen chamber 3:1 (h:v) or flatter? * ☒Yes ☐No

   This will be investigated during the PS&E phase.
9. Is maximum depth ≤ 13 ft below ground surface? * ☒Yes ☐No

   This will be investigated during the PS&E phase.
10. Can the Austin Sand Filter be placed in an offline configuration? ** ☒Yes ☐No

    This will be investigated during the PS&E phase.

Design Elements – Delaware Filter

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Is the drawdown time of the 2nd chamber between 40 and 48 hours, typically 40-hrs? * ☐Yes ☐No
2. Is access for Maintenance vehicles provided to the Delaware Filter? * ☐Yes ☐No
3. Is a bypass/overflow provided for storms > WQV? ** ☐Yes ☐No
4. Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? ** ☐Yes ☐No
5. Is maximum depth ≤ 13 ft below ground surface? * ☐Yes ☐No

Treatment BMPs
Checklist T-1, Part 9

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

MCTT (Multi-chambered Treatment Train)

Feasibility

1. Is the proposed location for the MCTT located to serve a "critical source area" (i.e. vehicle service facility, parking area, paved storage area, or fueling station)? ☐Yes ☒No
2. Is the WQV ≥ 4,346 ft³ [0.1 acre-foot]? ☒Yes ☐No
3. Is there sufficient hydraulic head (typically ≥ 6 feet) to operate the device? ☐Yes ☐No
4. Would a permanent pool of water be allowed by the local vector control agency? Confirm that check valves and vector proof lid as shown on standard detail sheets be allowed. ☐Yes ☒No

   If No to any question above, then an MCTT is not feasible.

5. Does adequate area exist within the right-of-way to place an MCTT(s)? ☐Yes ☐No
   If Yes, continue to Design Elements sections. If No, continue to Question 6.
6. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? _________ acres ☐Yes ☐No
   If Yes, continue to Design Elements section. If No, continue to Question 7.
7. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete
8. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors? ☐Yes ☐No

   If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Is the maximum depth of the 3rd chamber ≤ 13 ft below ground surface and has Maintenance accepted this depth? * ☐Yes ☐No
2. Is the drawdown time in the 3rd chamber between 24 and 48 hours, typically designed for 24-hrs? * ☐Yes ☐No
3. Is access for Maintenance vehicles provided to all chambers of the MCTT? * ☐Yes ☐No
4. Is there sufficient hydraulic head to operate the device? * ☐Yes ☐No
5. Has a bypass/overflow been provided for storms > WQV? * ☐Yes ☐No
6. Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation)? ** ☐Yes ☐No

Treatment BMPs

Checklist T-1, Part 10

Prepared by: W. Hsu Date: Jan 14, 2011 District-Co-Route: 06-FRE-99, 06-MAD-99, 10-MER-99

PM : Various Project ID (or EA): 0600020014 RWQCB: Central Valley Region 5

Wet Basin

Feasibility

1. Is the volume of the Wet Basin above the permanent pool equal to at least the WQV using a 24 to 96 hour drawdown (40 to 48 hour drawdown preferred)? (Note: the WQV must be ≥ 4,356 ft^3 [0.1 acre-feet] and the permanent pool must be at least 3x the WQV.) ☐Yes ☒No

2. Is a permanent source of water available in sufficient quantities to maintain the permanent pool for the Wet Basin? ☐Yes ☒No

3. Is proposed site in a location where naturally occurring wetlands do not exist? ☐Yes ☒No

   Answer either question 4 or question 5:

4. For Wet Basins with a proposed invert above the seasonally high groundwater, Are NRCS Hydrologic Soil Groups [HSG] C and D at the proposed invert elevation, or can an impermeable liner be used? (Note: If an impermeable liner is used, the seasonally high groundwater elevation must not encroach within 12 inches of the invert.) ☒Yes ☐No

5. For Wet Basins with a proposed invert below the groundwater table: Can written approval from the local Regional Water Quality Control Board be obtained to place the Wet Basin in direct hydraulic connectivity to the groundwater? ☐Yes ☒No

6. Is freeboard provided ≥ 1 foot? ☒Yes ☐No

7. Is the maximum impoundment volume < 14.75 acre-feet? ☐Yes ☒No

8. Would a permanent pool of water be allowed by the local vector control agency? ☐Yes ☒No

   If No to any question above, then a Wet Basin is not feasible.

9. Is the maximum basin width ≤ 49 ft as suggested in Section B.10.2? ☐Yes ☐No

   If No, consult with the local vector control agency and District Maintenance.

10. Does adequate area exist within the right-of-way to place a Wet Basin? ☐Yes ☐No
    If Yes, continue to Design Elements sections.

    If No, continue to Question 11.

11. If adequate area does not exist within right-of-way, can suitable, additional right-of-way be acquired to site the device and how much right-of way would be needed to treat WQV? __________ acres ☐Yes ☐No
    If Yes, continue to Design Elements section.

    If No, continue to Question 12.

12. Have the appropriate state and federal regulatory agencies been contacted to discuss location and potential to attract and harbor sensitive or endangered species? ☐Yes ☐No

    If No, contact the Regional/District NPDES Coordinator

13. If adequate area cannot be obtained, document in Section 5 of the SWDR that the inability to obtain adequate area prevents the incorporation of this Treatment BMP into the project. ☐Complete

14. Does the project discharge to a waterbody that has been placed on the 303-d list or has had a TMDL adopted for bacteria, mercury, sulfides, low dissolved oxygen, or odors? ☐Yes ☐No

    If yes, contact the Regional/District NPDES Storm Water Coordinator to determine if standing water in this treatment BMP would be a risk to downstream water quality. If standing water is a potential issue, consider use of another treatment BMP.

Design Elements

* **Required** Design Element – A "Yes" response to these questions is required to further the consideration of this BMP into the project design. Document a "No" response in Section 5 of the SWDR to describe why this Treatment BMP cannot be included into the project design.

** **Recommended** Design Element – A "Yes" response is preferred for these questions, but not required for incorporation into a project design.

1. Can a controlled outlet and an overflow structure be designed for storm events larger than the Water Quality event? * ☐Yes ☐No
2. Is access for Maintenance vehicles provided? * ☐Yes ☐No
3. Is the drawdown time for the WQV between 24 and 96 hours? * ☐Yes ☐No
4. Has appropriate vegetation been selected for each hydrologic zone? * ☐Yes ☐No
5. Can all design elements required by the local vector control agency be incorporated? * ☐Yes ☐No
6. Has a minimum flow path length-to-width ration of at least 2:1 been provided? ** ☐Yes ☐No
7. Has an upstream bypass been provided for storms > WQV? ** ☐Yes ☐No
8. Can pretreatment be provided to capture sediment and litter in the runoff (such as using vegetation, or a forebay)? ** ☐Yes ☐No
9. Can public access be restricted using a fence if proposed at locations accessible on foot by the public? ** ☐Yes ☐No
10. Is the maximum depth < 10 ft?" ☐Yes ☐No

IMPACT LOCATIONS

ATTACHMENT 3B

State Highway Impacts Matrix Table

No.	Sta	Alignment	County	Dist-County-Hwy-PM	Location	Impacts: Direct	Impacts: Indirect	HST Alternatives: Alignment A1	A1 Design Options: A1-Mission	A1 Design Options: A1-Mirapose	A1 Design Options: A1-21WYE	A1 Design Options: A1-24WYE	Alignment A2	A2 Design Options: A2-21WYE	A2 Design Options: A2-24WYE	A2 Design Options: A2-Chowchilla	Alignment Hybrid	Bridge Number (Existing Structure)	Bridge Number (New Facility)	HST OH or Local Road OC Description	Proposed Structure Type	Proposed Footing Type	Structure Width	Structure Length	Caltrans R/W	Skew Angle	Minimum Vertical Clearance Requirement	Actual Vertical Clearance	Minimimum Horizontal Clearance Requirement	Actual Horizontal Clearance	Dwg No.	Comments
1	*6124+22*	*A1-21-24MC*	*Merced*	*10-Mer-59 (PM 14.9)*	*SR 59 Mainline Crossover near W 15th Street*	x		x					x				x		Viaduct No. 14 (A1-21MC SB)	HST over SR59	HST Structure- Concrete Box Girder	CIDH	50'	-	100'	0˚±	16.5 ft	46'-2"±		13'±	SV1142 (A1)	
2	*6041+80*	*A1-21-24MC SB*	*Merced*	*10-Mer-99 (PM 14.2)*	*SR 99 Mainline Crossover near 15th Street Undercrossing*	x		x					x				x		Viaduct No. 14 (A1-21MC SB); Viaduct No. 113 (A2-21MC SB)	HST over SR99	HST Structure- CIP Concrete Box Girder	Spread	50'	-	610'	65˚±	16.5 ft	24'±		12'-6"±	SV1135 (A1), SV1579 (A2)	
3	*1610+00*	*A1-21MC-03*	*Merced*	*10-Mer-99 (PM 11.7)*	*SR 99/E Mission Ave Interchange*	x			x												HST Structure- Concrete Box Girder						17 ft					
4	*5879+00*		*Merced*	*10-Mer-99 (PM 10.2)*	*SR 99 Mainline Crossover near E Mission Ave*	x				x									Viaduct No. 14 (A1-21MC SB)	HST over SR99	HST Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'	-	VAR 250'-380'	75˚±	16.5 ft	17'		25'	SV1123	
5	*5903+00*		*Merced*	*10-Mer-99 (PM 0.0-10.5)*	*SR 99/Plainsburg (PM0.0-4.6) & Arboleda (PM 4.6-10.5) Interchanges*	x							x				x				Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-5" (Plainsburg & Arboleda)	550 (Plainsburg & Arboleda)		5˚±	23'-4" ft	31'±		7'-6"	SV1125	
6	*1130+80*	*A1-21ML*	*Madera*	*06-Mad-145 (PM 12.1)*	*SR 145 Mainline Crossover near Road 28 1/2*	x		x									x			HST over SR145	Roadway Bridge- CIP Concrete Box Girder		50'	120'		6^12'43"	16.5 ft	23'		7'-6"	CR1123-A to 1125-A, ST 1101	
7	*610+00*	*A1-21ML*	*Madera*	*06-Mad-99 (PM 19.8)*	*SR 99 Mainline Crossover near Ave 21*	x					x								Viaduct No. 1 (A1-21ML SB); Viaduct No. 21 (A1-21WC-EL)	HST over SR99	Roadway Bridge- CIP Concrete Box Girder	Spread	30' (A1-WC-21); 50' (A1)	-	220'	45˚±	16.5 ft	SR99=19'-11"± UPRR=23'-6"		15'±SR99 4'±UPRR	SV1004 (A1), SV1162 (A1-WC-21)	
8	*1220+00*	*A1-24ML*	*Madera*	*06-Mad-233 (PM 1.1)*	*SR 233 Mainline Crossover near Ave 23 1/2*	x						x			x		x		Highway 233 Overhead	SR233 over HST	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	425'		34^15'18"	23'-4" ft	27'			ST1005	
9	*1425+00*	*A1-24ML*	*Madera*	*06-Mad-99 (PM 23.7)*	*SR 99 Mainline Crossover near Ave 24*	x						x					x		Viaduct No. 81 (A1-24WC-AG)	HST over SR99	Roadway Bridge- Concrete Box Girder	CIDH	30' (A1-24WC-AG); 30' (A1-24WC-EL); 50' (A1-24ML)	-	VAR 270'-340'	25˚±	16.5 ft	19'-7"± NB off Ramp		16'	SV1344	
10	*5245+00*	*A2-21MC*	*Madera*	*06-Mad-99 (PM 28.5)*	*SB SR 99 On- and Off-Ramps near Chowchilla Blvd*	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HST Structure- Concrete Box Girder	CIDH	50'	-	115' (on-ramp); 230'-370' (off-ramp)	75˚ on & off ramp	16.5 ft	35' both		0' both	SV1534-1536	
11	*5155+00*	*A2-21MC*	*Madera*	*06-Mad-233 (PM 3.8)*	*SB SR 99 Off-Ramp*	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HST Structure- Concrete Box Girder	CIDH	50'	-	900'	15˚±	16.5 ft	24'-4"±		30'	SV1528	
12	*5150+00*	*A2-21MC*	*Madera*	*06-Mad-233 (PM 3.9)*	*SR 233 Mainline Crossover near SR 99/SR 233 Junction*	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR233	HST Structure- Concrete Box Girder	CIDH	50'	-	900'	25˚±	16.5 ft	17'		18'	SV1527	
13	*5155+00*	*A2-21MC*	*Madera*	*06-Mad-233 (PM 4.0)*	*SB SR 99 On-Ramp*	x							x						Viaduct No. 112 (A2-21MC SB)		HST Structure- Concrete Box Girder	CIDH	50'	-	900'	45˚±	16.5 ft	25'-8"±		14'	SV1527	
14	*4975+00*	*A2-21MC*	*Madera*	*06-Mad-99 (PM 23.2)*	*SR 99 Mainline Crossover near SR 99/SR 152 Junction*	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HST Structure- CIP Concrete Box Girder	Spread	50'	-	320'	60˚±	16.5 ft	17'		25'	SV1514	
15	*4850+00*	*A2-21MC; A2-24ML*	*Madera*	*06-Mad-99 (PM 20.8)*	*SR 99 Avenue 21 1/2 / Road 20 Interchange*	x							x		x	x			Viaduct No. 151 (A2-24ML SB)	HST over SR99	HST Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'			80˚±	16.5 ft to soffit of straddle bent	33'-5"±		16'	SV1505, SV1706, SV1707	
16	*4738+00*	*A2-21MC*	*Madera*	*06-Mad-99 (PM 18.7R)*	*SR 99/Avenue 20 & 20 1/2 Interchange*	x							x						Avenue 20 1/2 Overhead	Local Road Over HST/UPRR	Roadway Bridge- CIP Concrete Box Girder	CIDH	59'-6"	239'-11 3/4"		0^22'39"	16.5 ft	20'-3"			W-MF-ST-OH_Ave 20	
17	*4610+00*	*A2-21MC*	*Madera*	*06-Mad-99 (PM 16.3)*	*SR 99/Avenue 18 1/2 Interchange*	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HST Structure- CIP Concrete Box Girder	Spread	50'	-	280'	35˚±	16.5 ft	21'-5"±		30'	SV1424	
18	*897+20*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 14.2)*	*SR 99/Avenue 17 Interchange*	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HST Structure- Concrete Box Girder	CIDH	50'	-	210'	40˚±	16.5 ft	17'-7"±		22'±	SV1433	
19	*1074+15*	*A2-21ML*	*Madera*	*06-Mad-145 (PM 9.4)*	*SR 145 mainline Crossover at 6th Street*	x							x						Viaduct No. 101 (A2-21ML SB)	HST over SR145	HST Structure- Concrete Box Girder	CIDH	50'	-	90'	0˚±	16.5 ft	37-7"'±		23'±	SV1447	
20	*1182+22*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 8.7)*	*SR 99/Avenue 13 Overcrossing*	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HST Structure- Concrete Box Girder	CIDH	50'	-	270'	40˚±	16.5 ft	26'-6"±		20'±	SV1455	
21	*1250+00*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 7.5R)*	*SR 99/Avenue 12 Interchange*	x							x					41-0066	Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HST Structure- CIP Concrete Box Girder	Spread	50'	-	220'	40˚±	16.5 ft	20'-9"±		19'±	SV1460	
22	*1318+50*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 6.2R)*	*SR 99/Avenue 11 Overcrossing*	x							x					41-61	Avenue 11 Overhead	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	528'-2 1/8"		36^08'	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=19'; UPRR=24'0"; HST=27'0"		28'	W-MF-ST-OH_Ave 11	
23	*1456+60*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 3.6R)*	*SR 99/Avenue 9 Interchange*	x							x					41-0063	Avenue 9 Overcrossing	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	59'-6"	309'-3 5/8"		40˚±	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=19'-8" UPRR=27'-2" HST=27'-0"		35'	W-MF-ST-OH_Ave 9	
24	*1525+30*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 2.2R)*	*SR 99/Avenue 8 Overcrossing*	x							x					41-60	Avenue 8 Overhead	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	584'-3"		40^08'39"	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=16'-6"; UPRR=24'-0"; HST=27'-0"		34'	W-MF-ST-OH_Ave 8	
25	*932+40 to 950+00*	*A2-21WC*	*Madera*	*06-Mad-99 (PM 22.7)*	*SR 99 near SR 152 Junction*	x								x					Viaduct No. 131 (A2-21WC-AG); Viaduct No. 122 (A2-21WC-EL)	HST over SR99	A2-21WC-EL & A2-21WC-AG: HST Structure- Concrete Box Girder (SR152), CIP Concrete Box Girder (SR99, 1st crossing), Steel Composite Twin Boxes with Concrete Straddle Bent (SR99, 2nd crossing)	A2-21WC-EL & A2-21WC-AG: CIDH (SR152 & SR99, 2nd crossing), Spread (SR99, 1st crossing)	30'		A2-21WC-EL & A2-21WC-AG: 830' (SR152); 500' (SR99, 1st crossing); 320' (SR99, 2nd crossing)	15˚±	16.5 ft to soffit of straddle bent	17'		4'	SV1631; SV1632-SV1633; SV1616, 1617, 1618	
26	*700+00*	*A2-21ML*	*Madera*	*06-Mad-99 (PM 17.9)*	*SR 99 Mainline Crossover near Avenue 20*	x								x					Viaduct No. 101 (A2-21ML SB)	HST over SR99	HST Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'		210'	80˚±	16.5 ft to soffit of straddle bent	17'-0"		0'	SV1417, SV1418, SV1419	
27			*Madera*	*06-Mad-99 (PM 22.1)*	*SR 99 Mainline Crossover near Road 19*	x										x					HST Structure- Concrete Box Girder	CIDH				90˚±	17 ft	27'-0"		25'	SV1422	
28	*932+00*		*Madera*	*06-Mad-152 (PM 15.5)*	*SR 99 / SR 152 Junction*	x										x					HST Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH				40˚±	17 ft to soffit of straddle bent	17'		25'	SV1436	
29	*1420+00*	*A2-24ML*	*Madera*	*06-Mad-152 (PM 15.0)*	*SR 152 near Rd 18*	x									x				Viaduct No. 151 (A2-24ML SB)	HST over SR152	HST Structure- CIP Concrete Box Girder	Spread	50'		130	50˚±	16.5 ft	17'		6'	SV1696	
30	*1967+00 to 2072+00*	*A2A*	*Fresno*	*06-Fre-99 (PM 24.4-26.6)*	*SR 99 from Ashlan Ave to Clinton Ave*	x		x					x				x	42-0183		Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	114'-6"	274'		29^04'28"	16.5 ft	21'		8'	BR-1, BR-2	

=Missing structure plans.

ATTACHMENT 3B

State Highway Impacts Matrix Table

No.	Sta	Alignment	County	Dist-County-Hwy-PM	Location	Impacts		HST Alternatives										Bridge Number	Bridge Number	HST OH or Local Road OC Description	Proposed Structure Type	Proposed Footing Type	Structure Width	Structure Length	Caltrans R/W	Skew Angle	Minimum Vertical Clearance Requirement	Actual Vertical Clearance	Minimimum Horizontal Clearance Requirement	Actual Horizontal Clearance	Dwg No.	Comments
								Alignment	A1 Design Options				Alignment	A2 Design Options			Alignment	(Existing Structure)	(New Facility)													
						Direct	Indirect	A1	A1-Mission	A1-Miraposa	A1-21WYE	A1-24WYE	A2	A2-21WYE	A2-24WYE	A2-Chowchilla	Hybrid															
1	6124+22	A1-21-24MC	Merced	10-Mer-59 (PM 14.9)	SR 59 Mainline Crossover near W 15th Street	x		x					x				x		Viaduct No. 14 (A1-21MC SB)	HST over SR59	HSR Structure- Concrete Box Girder	CIDH	50'	-	100'	0˚±	16.5 ft	46'-2"±		13'±	SV1142 (A1)	
2	6041+80	A1-21-24MC SB	Merced	10-Mer-99 (PM 14.2)	SR 99 Mainline Crossover near 15th Street Undercrossing	x		x					x				x		Viaduct No. 14 (A1-21MC SB); Viaduct No. 113 (A2-21MC SB)	HST over SR99	HSR Structure- CIP Concrete Box Girder	Spread	50'	-	610'	65˚±	16.5 ft	24'±		12'-6"±	SV1135 (A1), SV1579 (A2)	
3	1610+00	A1-21MC-03	Merced	10-Mer-99 (PM 11.7)	SR 99/E Mission Ave Interchange	x			x												HSR Structure- Concrete Box Girder						17 ft					
4	5879+00		Merced	10-Mer-99 (PM 10.2)	SR 99 Mainline Crossover near E Mission Ave	x				x									Viaduct No. 14 (A1-21MC SB)	HST over SR99	HSR Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'	-	VAR 250'-380'	75˚±	16.5 ft	17'		25'	SV1123	
5	5903+00		Merced	10-Mer-99 (PM 0.0-10.5)	SR 99/Plainsburg (PM0.0-4.6) & Arboleda (PM 4.6-10.5) Interchanges	x							x				x				Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-5" (Plainsburg & Arboleda)	550 (Plainsburg & Arboleda)		5˚±	23'-4" ft	31'±		7'-6"	SV1125	
6	1130+80	A1-21ML	Madera	06-Mad-145 (PM 12.1)	SR 145 Mainline Crossover near Road 28 1/2	x		x									x			HST over SR145	Roadway Bridge- CIP Concrete Box Girder		50'	120'		6^12'43"	16.5 ft	23'		7'-6"	CR1123-A to 1125-A, ST 1101	
7	610+00	A1-21ML	Madera	06-Mad-99 (PM 19.8)	SR 99 Mainline Crossover near Ave 21	x					x								Viaduct No. 1 (A1-21ML SB); Viaduct No. 21 (A1-21WC-EL)	HST over SR99	Roadway Bridge- CIP Concrete Box Girder	Spread	30' (A1-WC-21); 50' (A1)	-	220'	45˚±	16.5 ft	SR99=19'-11"± UPRR=23'-6"		15'±SR99 4'±UPRR	SV1004 (A1), SV1162 (A1-WC-21)	
8	1220+00	A1-24ML	Madera	06-Mad-233 (PM 1.1)	SR 233 Mainline Crossover near Ave 23 1/2	x						x			x		x		Highway 233 Overhead	SR233 over HST	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	425'		34^15'18"	23'-4" ft	27'			ST1005	
9	1425+00	A1-24ML	Madera	06-Mad-99 (PM 23.7)	SR 99 Mainline Crossover near Ave 24	x						x					x		Viaduct No. 81 (A1-24WC-AG)	HST over SR99	Roadway Bridge- Concrete Box Girder	CIDH	30' (A1-24WC-AG); 30' (A1-24WC-EL); 50' (A1-24ML)	-	VAR 270'-340'	25˚±	16.5 ft	19'-7"± NB off Ramp		16'	SV1344	
10	5245+00	A2-21MC	Madera	06-Mad-99 (PM 28.5)	SB SR 99 On- and Off-Ramps near Chowchilla Blvd	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HSR Structure- Concrete Box Girder	CIDH	50'	-	115' (on-ramp); 230'-370' (off-ramp)	75˚ on & off ramp	16.5 ft	35' both		0' both	SV1534-1536	
11	5155+00	A2-21MC	Madera	06-Mad-233 (PM 3.8)	SB SR 99 Off-Ramp	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HSR Structure- Concrete Box Girder	CIDH	50'	-	900'	15˚±	16.5 ft	24'-4"±		30'	SV1528	
12	5150+00	A2-21MC	Madera	06-Mad-233 (PM 3.9)	SR 233 Mainline Crossover near SR 99/SR 233 Junction	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR233	HSR Structure- Concrete Box Girder	CIDH	50'	-	900'	25˚±	16.5 ft	17'		18'	SV1527	
13	5155+00	A2-21MC	Madera	06-Mad-233 (PM 4.0)	SB SR 99 On-Ramp	x							x						Viaduct No. 112 (A2-21MC SB)		HSR Structure- Concrete Box Girder	CIDH	50'	-	900'	45˚±	16.5 ft	25'-8"±		14'	SV1527	
14	4975+00	A2-21MC	Madera	06-Mad-99 (PM 23.2)	SR 99 Mainline Crossover near SR 99/SR 152 Junction	x							x						Viaduct No. 112 (A2-21MC SB)	HST over SR99	HSR Structure- CIP Concrete Box Girder	Spread	50'	-	320'	60˚±	16.5 ft	17'		25'	SV1514	
15	4850+00	A2-21MC; A2-24ML	Madera	06-Mad-99 (PM 20.8)	SR 99 Avenue 21 1/2 / Road 20 Interchange	x							x		x	x			Viaduct No. 151 (A2-24ML SB)	HST over SR99	HSR Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'			80˚±	16.5 ft to soffit of straddle bent	33'-5"±		16'	SV1505, SV1706, SV1707	
16	4738+00	A2-21MC	Madera	06-Mad-99 (PM 18.7R)	SR 99/Avenue 20 & 20 1/2 Interchange	x							x						Avenue 20 1/2 Overhead	Local Road Over HST/UPRR	Roadway Bridge- CIP Concrete Box Girder	CIDH	59'-6"	239'-11 3/4"		0^22'39"	16.5 ft	20'-3"			W-MF-ST-OH_Ave 20	
17	4610+00	A2-21MC	Madera	06-Mad-99 (PM 16.3)	SR 99/Avenue 18 1/2 Interchange	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HSR Structure- CIP Concrete Box Girder	Spread	50'	-	280'	35˚±	16.5 ft	21'-5"±		30'	SV1424	
18	897+20	A2-21ML	Madera	06-Mad-99 (PM 14.2)	SR 99/Avenue 17 Interchange	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HSR Structure- Concrete Box Girder	CIDH	50'	-	210'	40˚±	16.5 ft	17'-7"±		22'±	SV1433	
19	1074+15	A2-21ML	Madera	06-Mad-145 (PM 9.4)	SR 145 mainline Crossover at 6th Street	x							x						Viaduct No. 101 (A2-21ML SB)	HST over SR145	HSR Structure- Concrete Box Girder	CIDH	50'	-	90'	0˚±	16.5 ft	37-7"'±		23'±	SV1447	
20	1182+22	A2-21ML	Madera	06-Mad-99 (PM 8.7)	SR 99/Avenue 13 Overcrossing	x							x						Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HSR Structure- Concrete Box Girder	CIDH	50'	-	270'	40˚±	16.5 ft	26'-6"±		20'±	SV1455	
21	1250+00	A2-21ML	Madera	06-Mad-99 (PM 7.5R)	SR 99/Avenue 12 Interchange	x							x					41-0066	Viaduct No. 101 (A2-21ML SB)	HST over Local Road	HSR Structure- CIP Concrete Box Girder	Spread	50'	-	220'	40˚±	16.5 ft	20'-9"±		19'±	SV1460	
22	1318+50	A2-21ML	Madera	06-Mad-99 (PM 6.2R)	SR 99/Avenue 11 Overcrossing	x							x					41-61	Avenue 11 Overhead	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	528'-2 1/8"		36^08'	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=19'; UPRR=24'0"; HST=27'0"		28'	W-MF-ST-OH_Ave 11	
23	1456+60	A2-21ML	Madera	06-Mad-99 (PM 3.6R)	SR 99/Avenue 9 Interchange	x							x					41-0063	Avenue 9 Overcrossing	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	59'-6"	309'-3 5/8"		40˚±	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=19'-8" UPRR=27'-2" HST=27'-0"		35'	W-MF-ST-OH_Ave 9	
24	1525+30	A2-21ML	Madera	06-Mad-99 (PM 2.2R)	SR 99/Avenue 8 Overcrossing	x							x					41-60	Avenue 8 Overhead	Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	47'-6"	584'-3"		40^08'39"	16.5 ft (SR99); 23'-4" (UPRR & HST)	SR99=16'-6"; UPRR=24'-0"; HST=27'-0"		34'	W-MF-ST-OH_Ave 8	
25	932+40 to 950+00	A2-21WC	Madera	06-Mad-99 (PM 22.7)	SR 99 near SR 152 Junction	x								x					Viaduct No. 131 (A2-21WC-AG); Viaduct No. 122 (A2-21WC-EL)	HST over SR99	A2-21WC-EL & A2-21WC-AG: HSR Structure- Concrete Box Girder (SR152), CIP Concrete Box Girder (SR99, 1st crossing), Steel Composite Twin Boxes with Concrete Straddle Bent (SR99, 2nd crossing)	A2-21WC-EL & A2-21WC-AG: CIDH (SR152 & SR99, 2nd crossing), Spread (SR99, 1st crossing)	30'		A2-21WC-EL & A2-21WC-AG: 830' (SR152); 500' (SR99, 1st crossing); 320' (SR99, 2nd crossing)	15˚±	16.5 ft to soffit of straddle bent	17'		4'	SV1631; SV1632-SV1633; SV1616, 1617, 1618	
26	700+00	A2-21ML	Madera	06-Mad-99 (PM 17.9)	SR 99 Mainline Crossover near Avenue 20	x								x					Viaduct No. 101 (A2-21ML SB)	HST over SR99	HSR Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH	50'		210'	80˚±	16.5 ft to soffit of straddle bent	17'-0"		0'	SV1417, SV1418, SV1419	
27			Madera	06-Mad-99 (PM 22.1)	SR 99 Mainline Crossover near Road 19	x										x					HSR Structure- Concrete Box Girder	CIDH				90˚±	17 ft	27'-0"		25'	SV1422	
28	932+00		Madera	06-Mad-152 (PM 15.5)	SR 99 / SR 152 Junction	x										x					HSR Structure- Steel Composite Twin Boxes with Concrete Straddle Bent	CIDH				40˚±	17 ft to soffit of straddle bent	17'		25'	SV1436	
29	1420+00	A2-24ML	Madera	06-Mad-152 (PM 15.0)	SR 152 near Rd 18	x									x				Viaduct No. 151 (A2-24ML SB)	HST over SR152	HSR Structure- CIP Concrete Box Girder	Spread	50'		130	50˚±	16.5 ft	17'		6'	SV1696	
30	1967+00 to 2072+00	A2A	Fresno	06-Fre-99 (PM 24.4-26.6)	SR 99 from Ashlan Ave to Clinton Ave	x		x					x				x	42-0183		Local Road Over HST/UPRR/SR99	Roadway Bridge- CIP Concrete Box Girder	CIDH	114'-6"	274'		29^04'28"	16.5 ft	21'		8'	BR-1, BR-2	

=Missing structure plans.

TREATMENT BMP SUMMARY SPREADSHEET

Treatment BMPs Summary
SR 99 Realignment Portion from Clinton Ave to Ashlan Ave

Alternative 1

This alternative includes biofiltration swales and infiltraton basins as the primary treatment BMP selections.

Biofiltration Swales

District-County-Route: 06-FRE-99
EA: 06-002014

County	Route	Bioswale	STA Begin		STA End		Paved TDA (ac)	Unpaved TDA (ac)	Total TDA (ac)	Water Quality Volume (Cubic feet)	Water Quality Flow (cfs)	Length (ft)
Fresno	99	29L	"C3"	26+60	"C3"	33+60	0.848	0.492	1.340	2073	0.16	690
Fresno	99	37L	"C3"	34+50	"C3"	42+00	0.826	0.551	1.377	2087	0.16	760
Fresno	99	39L	"MS"	33+70	"MS"	45+50	2.176	1.123	3.299	5187	0.39	1190
Fresno	99	47L	"C2"	45+00	"C2"	49+10	0.551	0.413	0.964	1435	0.11	400
Fresno	99	51L	"A"	48+50	"A"	56+00	1.171	0.809	1.980	2985	0.23	750
Fresno	99	53L	"C2"	49+10	"C2"	54+50	0.564	0.496	1.060	1539	0.12	540
Fresno	99	59L	"C2"	54+50	"C2"	65+55	2.091	1.010	3.101	4919	0.37	1420
Fresno	99	62R	"C1"	53+30	"A"	65+55	2.359	0.786	3.145	5215	0.40	1223
Fresno	99	70R	"A"	65+55	"A"	78+00	2.100	0.987	3.087	4914	0.37	1245
Fresno	99	73L	"A"	65+55	"A"	78+00	1.943	1.143	3.086	4765	0.36	1245
Fresno	99	81L	"A"	78+00	"A"	89+95	1.865	1.097	2.962	4573	0.35	1195
Fresno	99	82R	"A"	78+00	"A"	89+95	1.865	1.097	2.962	4573	0.35	1195
Fresno	99	95L	"A"	89+95	"A"	99+10	1.428	0.840	2.268	3502	0.27	915
Fresno	99	96R	"A"	89+95	"A"	99+10	1.428	0.840	2.268	3502	0.27	915
Fresno	99	104R	"A"	99+10	"A"	111+30	1.904	1.120	3.024	4669	0.35	1220
Fresno	99	105L	"A"	99+10	"A"	111+30	1.904	1.120	3.024	4669	0.35	1220
Fresno	99	118R	"A"	111+30	"AS4"	123+00	1.901	1.031	2.932	4579	0.35	1170
Fresno	99	121L	"A"	111+30	"AS3"	128+30	2.757	1.566	4.323	6708	0.51	1705
						TOTALS	29.68	16.52	46.20	71,894	5.46	

Infiltration Basins

County	Route	Infiltration Basin	Paved TDA (ac)	Unpaved TDA (ac)	Total TDA (ac)	Water Quality Volume (Cubic feet)
Fresno	99	37L	4.202	4.982	9.184	12,464
Fresno	99	133L	7.931	4.278	12.209	18,752
	TOTALS		12.13	9.26	21.39	31,216

Total Paved Area Treated:	35.18	ac *
Total Post-Project Paved Area:	46.10	ac
Percent of Paved Area Treated:	76.3%	

* Infiltration Basin 37L includes 1.97 acres of paved area treated by BSW 39L. IFB 133L includes 4.66 ac of paved area treated by BSWs 118R and 121L. These areas are excluded from the calculation of total paved area treated.

Treatment BMPs Summary
SR 99 Realignment Portion from Clinton Ave to Ashlan Ave

Alternative 2
This alternative includes infiltration trenches and basins as the primary treatment BMP selections. BSWs are used as pre-treatment for the IFTs.

Biofiltration Swales

District-County-Route: 06-FRE-99
EA: 06-002014

County	Route	Bioswale		STA Begin		STA End	Paved TDA (ac)	Unpaved TDA (ac)	Total TDA (ac)	Water Quality Volume (Cubic feet)	Water Quality Flow (cfs)	Length (ft)
Fresno	99	29L	"C3"	26+60	"C3"	33+60	0.848	0.492	1.340	2073	0.16	690
Fresno	99	37L	"C3"	34+50	"C3"	42+00	0.826	0.551	1.377	2087	0.16	760
Fresno	99	39L	"MS"	33+70	"MS"	45+50	2.176	1.123	3.299	5187	0.39	1190
Fresno	99	47L	"C2"	45+00	"C2"	49+10	0.551	0.413	0.964	1435	0.11	400
Fresno	99	51L	"A"	48+50	"A"	56+00	1.171	0.809	1.980	2985	0.23	750
Fresno	99	53L	"C2"	49+10	"C2"	54+50	0.564	0.496	1.060	1539	0.12	540
Fresno	99	59L	"C2"	54+50	"C2"	65+55	2.091	1.010	3.101	4919	0.37	1420
Fresno	99	62R	"C1"	53+30	"A"	65+55	2.359	0.786	3.145	5215	0.40	1223
Fresno	99	70R	"A"	65+55	"A"	78+00	2.100	0.987	3.087	4914	0.37	1245
Fresno	99	73L	"A"	65+55	"A"	78+00	1.943	1.143	3.086	4765	0.36	1245
Fresno	99	81L	"A"	78+00	"A"	89+95	1.865	1.097	2.962	4573	0.35	1195
Fresno	99	82R	"A"	78+00	"A"	89+95	1.865	1.097	2.962	4573	0.35	1195
Fresno	99	95L	"A"	89+95	"A"	99+10	1.428	0.840	2.268	3502	0.27	915
Fresno	99	96R	"A"	89+95	"A"	99+10	1.428	0.840	2.268	3502	0.27	915
Fresno	99	104R	"A"	99+10	"A"	111+30	1.904	1.120	3.024	4669	0.35	1220
Fresno	99	105L	"A"	99+10	"A"	111+30	1.904	1.120	3.024	4669	0.35	1220
Fresno	99	118R	"A"	111+30	"AS4"	123+00	1.901	1.031	2.932	4579	0.35	1170
Fresno	99	121L	"A"	111+30	"AS3"	128+30	2.757	1.566	4.323	6708	0.51	1705
						TOTALS	29.68	16.52	46.20	71,894	5.46	

Infiltration Basins

County	Route	Infiltration Basin	Paved TDA (ac)	Unpaved TDA (ac)	Total TDA (ac)	Water Quality Volume (Cubic feet)
Fresno	99	37L	4.202	4.982	9.184	12,464
Fresno	99	133L	7.931	4.278	12.209	18,752
		TOTALS	12.13	9.26	21.39	31,216

Infiltration Trenches

County	Route	Infiltration Basin	Paved TDA (ac)	Unpaved TDA (ac)	Total TDA (ac)	Water Quality Volume (Cubic feet)	Trench Length (ft)	Trench Width (ft)	Trench Depth (ft)
Fresno	99	d/s of BSW 59L	2.091	1.010	3.101	4,834	202	12	6.7
Fresno	99	d/s of BSW 62R	2.359	0.786	3.145	5,125	214	12	6.7
Fresno	99	d/s of BSW 70R	2.100	0.987	3.087	4,830	202	12	6.7
Fresno	99	d/s of BSW 73L	1.943	1.143	3.086	4,682	196	12	6.7
Fresno	99	d/s of BSW 81L	1.865	1.097	2.962	4,494	188	12	6.7
Fresno	99	d/s of BSW 82R	1.865	1.097	2.962	4,494	188	12	6.7
Fresno	99	d/s of BSW104R	1.904	1.120	3.024	4,588	192	12	6.7
Fresno	99	d/s of BSW 105L	1.904	1.120	3.024	4,588	192	12	6.7
Fresno	99	d/s of BS 118R	1.901	1.031	2.932	4,500	188	12	6.7
Fresno	99	d/s of BSW 121L	2.757	1.566	4.323	6,592	275	12	6.7
		TOTALS	20.69	10.96	31.65	48,729			

	Total Paved Area Treated:	35.18	ac *
	Total Post-Project Paved Area:	46.10	ac
*	Percent of Paved Area Treated:	76.3%	

Infiltration Basin 37L includes 1.97 acres of paved area treated by BSW 39L. IFB 133L includes 4.66 ac of paved area treated by BSWs 118R and 121L.
These areas are excluded from the calculation of total paved area treated.